JPRS L/8991

21 March 1980

USSR Report

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

(FOUO 5/80)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

For further information on report content call (703) 351-2938 (economic); 3468 (political, sociological, military); 2726 (life sciences); 2725 (physical sciences).

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200060032-8

JPRS L/8991

21 March 1980

USSR REPORT

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

(FOUO 5/80)

This serial publication contains articles, abstracts of articles and news items from USSR scientific and technical journals on the specific subjects reflected in the table of contents.

Photoduplications of foreign-language sources may be obtained from the Photoduplication Service, Library of Congress, Washington, D. C. 20540. Requests should provide adequate identification both as to the source and the individual article(s) desired.

CONTENTS PAGE

CONTENTS (Continued) Page

CONTENTS (Continued)

HARDWARE

ANALOG AND DIGITAL INTEGRATED CIRCUITS

Moscow ANALOGOVYE I TSIFROVYE INTEGRAL'NYE SKHEMY in Russian 1979 pp 331-333

[Article by S. V. Yakubovskiy, signed to press April 1979]

[Text] Conclusions

Microelectronics has developed very quickly. In 1977-1978, new technological areas were mastered, new microcircuits were developed for memories and microprocessors based on p and n-type MOS-structures, bipolar injection circuits (I^2L) and transistor-transistor logical circuits with Shottky diodes.

During the preparation and publication of this book a number of MOS-transistor permanent memories and a number of microprocessor complexes were developed and introduced into production.

The new memory circuit--integrated circuit 556RT4--is of interest. This is a 1024-bit permanent memory with the capacity for one-time programming by the user. Made from transistor-transistor logical elements with Shottky diodes, it allows an address access time of 90 nanoseconds with an intake power of 0.5 milliwatts/bit.

The 4096-bit K535RYe1 and K505RYe3 integrated circuits have been developed on the basis of p-type MOS-structures. They can be programmed by request cards. The K535RYe1 integrated circuit has an access time of 1.7 microseconds with an intake power of 0.12 milliwatts/bit. The K505RYe3 integrated circuit has an access time of 1.5 microseconds with an intake power of 0.25 milliwatts/bit. The system input is coupled to the TTL [transistor-transistor logical] circuit through the 133LA15 microcircuit; the output is coupled directly to the TTL-circuit.

The K568RYe1 integrated circuit with complete address decoding, output amplifiers and "integrated circuit access" control circuit was built on the basis of the N-type MOS-structure. This integrated circuit is also programmed by request cards. The circuit is characterized by high information capacity (by comparison with the previously made mask type permanent memories) --16,384 bits (2048 x 8), with an intake power of 0.021 milliwatts/bit, an information read-out time of 0.8 microseconds, and the circuit output coupled to the TTL-circuits.

The K573RR11-K573RR14 integrated circuit with ultraviolet erasure of information providing for long term storage of the information with the power supplies disconnected is of great interest. The microcircuit has an information capacity of 4096 bits with various memory organizations: two K573RR11 and K573RR12 circuits have 512 x 8 bit memory organization and are distinguished by the functional purpose of the outputs; the K573RR13 and K573RR14 circuits have 1024 x 4 memory organization and are distinguished by functional purpose. The circuits have 10 reprogramming cycles and an information storage time of 10,000 hours.

The series K581, K536, K584, K582 and K588 microprocessor complexes have also been developed and introduced into production in recent years.

The series 536 microprocessor complex is made from p-type MOS-structures, and it has 13 microcircuits providing for the following functions: arithematic-logical circuits (K536IK1 and K536IK9); microprogramming circuits (K536IK2 and K536IK8); the input-output control circuits (K536IK3, K536IK4 and K536IK5); voltage-to-code conversion (K536IK6); selector channel control circuits (K536IK7). In addition, the complex includes two power amplifiers (K536UI1 and K536UI2) and the cycle pulse generator circuit (K536GP1).

The series K581 microprocessor complex is made from the n-type MOS structures, and it has five microcircuits performing the following functions: the arithematic-logical register circuit (K581IK1, I581IK1A)*; the operations control (K581IK2, K581IK2A); the microprogramming memory (K581RU1, K581RU1A); the microinstruction memory (K581RU2, K581RU2A) and also the microprogramming memory for executing the expanded arithematic operations and floating-point operations (K581RU3 and K581RU3A).

The four-bit parallel microprocessors based on injection logic (I^2L) were built from the series K582 and K584 microcircuits. The KMOS-structures were used to develop the microprogramming control circuit for the K588IK1 microprocessor.

In recent times, new analog microcircuits have also been developed. They include the following: the medium-power K157UD1A, B operation amplifier with maximum output current to 300 milliamps, the high-speed K574UD1 operation amplifier with output voltage buildup rate to 50 volts/microsecond, and the K55U1D1A, B precision operation amplifier.

The list of comparators has been supplemented by the following microcircuits: 597SA1 operating on the ESL-logic and 597SA2 compatible with the TTL-logic. The 140UD13 preamplifier has been developed with input impedance of no less than 50 megohms.

---

* The K581IK1 circuit with the index A has a cycle time of $\geq$ 600 nanoseconds; without the index the cycle time is $\geq$ 400 nanoseconds.

The series of microcircuits designed for remote and radio receivers has been supplemented by the K174UN8 power amplifier with output power of two watts, the K174UN9 power amplifier with output power to 7 watts. The following television circuits have been developed and assimilated in series production: the K174UP1 brightness signal amplifier, the K174UR3 limiter-amplifier, the K174KhA3 noise suppressor in the sound information channels, and the K174KhA1 color-difference red-blue signal detector.

The set of semiconducting circuits of the analog-to-digital converters has been further expanded. The following have been developed: the 10-bit analog-to-digital converter based on the 572PA1 type MOS-transistors with multiplication, compatible with the TTL-circuits, and the 12-bit analog-to-digital converter based on the 594PA1 type MOS-transistors, compatible with the TTL-circuits. The series of commutators has been supplemented by the 16-channel MOS-commutator with the 590KN1 and 591KN1 decoders compatible with respect to levels with the TTL-logic, and, finally, the power supply integrated circuits have been further developed. The 142YeN3 and 142YeN4 integrated voltage stabilizers with external voltage divider with an output current to 1 amp have been developed.

The rates of development of Soviet microelectronics are such that in a few years the integrated microcircuits investigated in this book, both logical and analog, will change significantly, and part of the reference material will lose its significance. However, the basic principle of the authors remains unchanged: the high potential reliability of integrated microcircuits established during their development and production must be maintained in the development, production and operation of radioelectronic equipment. If the authors have managed to convey this idea to the reader they consider their mission fulfilled.

10845
CSO: 1863

USSR UDC 681.327.69'22(088.8)(47)

A DEVICE FOR DEPICTING VECTORS ON THE SCREEN OF A CATHODE RAY TUBE (CRT)

Moscow AVTORSKOYE SVIDETEL'STVO SSSR NO 561984 in Russian class G 06 K 15/20 published 15 Jul 77 claimed 2 Apr 75 No 2119929

NEPOMNYASHCHIKH, V. G., STOLYARENKO, V. S. and NIKOLYAYEV, YU. N., Scientific Research Institute for Control Computers

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B726P]

[Text] A device is proposed for displaying vectors on the screen of a CRT which contains the following: code registers for the increments in the length of a vector along the X and Y coordinates and a control unit (B) coupled through an X and Y coordinate amplifier to the CRT, where the control amplifier and the control unit are connected in series; a block of control generators; an inverter which is coupled to an adder; a modulation block and the CRT. The unit likewise contains a comparison unit, a coincidence gate for the X and Y coordinates and a code shifter for the X and Y coordinates. The registers for the codes for the X and Y coordinate increments in the length of a vector are connected to the comparison unit and respectively to the comparison gate and code shifter, which is connected to the adder and to the comparison unit. Figures 1; references 2. [442-8225]

8225
CSO: 1863

USSR UDC 681.327.636(088.8)

POLISH PATENT 83064. A METHOD OF OBTAINING A STRAIGHT WIRE FROM BERYLLIUM BRONZE

Warsaw SPOSOB OTRZYMYWANIA PROSTEGO DRUTU Z BRAZU BERYLOWEGO in Polish class C 11 b 5/84 published 15 Nov 76 claimed 16 Dec 71 No 152200

PRZYLUSKI JAN, MILCZAREK MIROSLAW, BIELINSKI JERZY, WOLSKI KAZIMIERZ and MIECZNIKOWSKI ANDRZEJ, Warsaw Polytechnical Institute

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B449P by A. S. Kovalev]

[Text] A method for continuous fabrication of a wire from beryllium bronze, used in the substrate in the manufacture of computer memory elements, is proposed. The highly productive and low labor process permits the manufacture of a wire with a diameter of 0.1 to 1 mm with a sag of about 1 mm in a segment 50 cm long, which is characterized by a tensile strength of about 120 kg/mm^2, a pulling of about 1 percent and a microhardness of over 450 kg/mm^2. Using the proposed method, the blank with a diameter of about 0.1-4 mm, following heat treatment in an oxygen free medium or in a vacuum is subjected to repeated drawing down to a thickness reduction of about 75 percent, after which it is annealed at a temperature of 370 - 430°C, with variations of $\pm$5°C over a period of 8 minutes. Then the wire is fed to a winding tool by means of mechanical transporters, where the tool winds it on drums or reels with a diameter of 400 - 1,500 mm.
[442-8225]

8225
CSO: 1863

USSR UDC 681.322.01

INTEGRATION OF M-6000 MINICOMPUTER WITH THE UNIFIED SYSTEM OF ELECTRONIC COMPUTERS

Riga VYCHISLITEL'NYYE KOMPLEKSY V SISTEMAKH AVTOMATIZIROVANNYKH NAUCHNYKH ISSLEDOVANIY in Russian Zinatne Publishers 1977 pp 120-126

BUGAYEV, N. N., GERNET, YE. D., GORODILOV, V. V., DOGAD'KO, G. G., ZABIYAKIN, G. I., KOSTELYANSKIY, V. M., LARIONOV, K. A., POZHIL'TSOV, O. F., ROZENBERG, A. YE. and RYKOVANOV, S. N.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B19]

[Text] The general problems of integrating two machines of different classes are treated: the YeS-EVM [unified system of electronic computers] and the M-6000 minicomputers for the purpose of building local multimachine complexes, as well as the problems of the distribution of functions with respect to matching the interfaces between the software and the hardware. The variants selected for operation with the YeS EVM, M-6000 and the matcher are briefly set forth and substantiated. Figures 2; references 2. [442-8225]

8225
CSO: 1863

USSR UDC 681.3

INTEGRATION OF SPECIAL-PURPOSE REAL-TIME COMPUTERS WITH THE YeS TYPE GENERAL-PURPOSE COMPUTER

SAKARTVELOS SSR METSNIYEREBATA AKADEMIA. MARTVIS SISTEMEBIS INSTITUTI SHROMEBI. TR. IN-T SISTEM UPR. AN GRUZ SSR in Russian Vol 18 No 1, 1979 pp 19-23

MANDZHAVIDZE, N. S. and KAZARYAN, G. YA.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 10, 1979 Abstract No 10 I318]

[Text] The interfacing is considered of a real-time special-purpose computer with an YeS type general-purpose computer (and in particular with the ASVT-M4030 computer). The input-output instructions enabling both the M4030 computer and the special-purpose computer to exchange control information and data are described. References 2.
[155-1386]

1386
CSO: 1863

USSR UDC 681.326.34

AN INTERFACE BETWEEN THE TRA-I 1001 AND THE MINSK-22 COMPUTERS DESIGNED TO CAMAC STANDARDS

Dubna OB'YEDINENNYY INSTITUT YADERNYKH ISSLEDOVANIY. SOOBSHCHENIYA [Joint Nuclear Research Institute. Report] in Russian No 11-10840, 1977 9 pp

LODOYSAMBA, S.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B764K]

[Text] An interface unit is described which is designed to CAMAC standards and which makes it possible to couple a set of CAMAC standard equipment (including a small computer or a sophisticated controller) to a large computer of the Joint Nuclear Research Institute instrumentation computer complex. The unit serves for coupling between the CAMAC complex at the LNF [expansion unknown] using the TRA-I 1001 and "Minsk-22" computer.
[442-8225]

8225
CSO: 1863

USSR

UDC 681.327.66:192

MODELING THE RELIABILITY OF IMMEDIATE ACCESS SEMICONDUCTOR MEMORIES (PPOZU) WITH RESPECT TO SUDDEN FAILURES

Moscow TRUDY MOSKOVSKOGO ENERGETICHESKOGO INSTITUTE (Works of Moscow Power Engineering Institute) in Russian No 343, 1977 pp 55-57

SHARAPOV, A. P.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B439 by V. T. Mitroshina]

[Text] A reliability indicator, the probability of the absence of an undetected error in a read word, is introduced as a more complete characteristic of a PPOZU [Immediate Access Semiconductor Memory]. Simulation modeling is used to study PPOZU reliability. A block diagram of the modeling algorithm is shown. To simplify the model, it is assumed that there are seven types of memory module failure: failures of a memory microcircuit, of an address driver, of a bit driver, of a read unit, of shift selection drivers and the access mode, as well as circuit board failure, while solder connection and plug contact failures are included in the failures of the components cited above. A Poisson is adopted for the failures. In this case, a random sample is generated for the points in time of a failure. Then the type and location of the failure are determined. In each cycle, the modeling is continued up to the point in time when errors occur in two or more bits of one group being monitored. Figures 2; references 3. [442-8225]

8225
CSO: 1863

USSR UDC 681.325.65(088.8)(47)

A DEVICE FOR COMPARING BINARY NUMBERS

Moscow AVTORSKOYE SVIDETEL'STVO SSSR NO 56432 in Russian Class G 06 F 7/04 published 17 Aug 77 claim no 2160551 claimed 1 Aug 75

KIRICHENKO, M. P., SARKISOV, A. M., MANGASAROV, A. G. and BURMINSKIY, V. S., Special Project Planning and Design Office for Automated Petroleum Extraction, Gas Storage and Transportation Equipment

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B411P]

[Text] The proposed device contains a reference voltage source, the output buses of which are connected to the supply buses for the digit by digit comparison locations, which consist of two "AND" gates. The inputs of each of the "AND" gates are connected to the corresponding inputs of the device buses, while the outputs are connected to the output buses of the digit by digit comparison locations. Moreover, the device contains a threshold gate and a "NOR" gate. For the purpose of simplifying the device, it contains two units for ascertaining the maximum voltage, the inputs of which are connected to the corresponding outputs of the digit by digit comparison locations, while the outputs are connected to the inputs of the threshold gate. The outputs of the threshold gate are connected to the first and second output buses of the device and through the "NOR" to the third output bus of the device. Figures 1.
[442-8225]

8225
CSO: 1863

USSR UDC 681.325.57(088.8)(47)

A TABULAR DEVICE FOR MODULUS MULTIPLICATION IN A SYSTEM OF REMAINDER CLASSES

Moscow AVTORSKOYE SVIDETEL'STVO SSSR NO 550636 in Russian Class G 06 F 7/52 published 21 Mar 77 claim no 1655105 18 May 71

SOBORNIKOV, YU. P., DOLINSKAYA, N. A. and PAKHOMOVA, A. P., Institute of Automation of the Ministry of Instrument Construction Equipment and Automation and Control Systems of the USSR

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B402P]

[Text] The device contains a matrix of code registering elements, for example, coordinate transformers, and operand decoders and search logic circuits connected to it through gating and switching elements. For the purpose of simplifying the device and increasing its operational speed, the outputs of the operand decoders for the rows (or columns) of the base square of the matrix are coupled through corresponding groups of integrated circuit gating elements to the inputs of transistor switches and drivers. The controlling inputs of the gating elements are connected to the corresponding outputs of the search logic circuit for the base square relative to the quadrant diagonal. The collector outputs of the transistor switches and the emitter outputs of the drivers are connected to each other through integrated assemblies and the primary windings of the coordinate transformers. The secondaries of the transformers are coupled to the starting points of the code buses for the decoding of the values of the nodes of the phase squares in additionally introduced passive transformer lines. The ends of the code buses are coupled through integrated ring circuits to a decoder for the numbers of the base squares of a quadrant, and connected to the zero potential bus. The control inputs of the secondaries of the transformers for the rule lines are connected to the corresponding outputs of the search logic circuit of the quadrant relative to the axes of the arithmetic table. Figures 6.
[442-8225]

8225
CSO: 1863

SOFTWARE

USSR UDC 681.519.712

STRUCTURE OF PROGRAM PACKAGE FOR HALF-TONE IMAGE PROCESSING

TRUDY INSTITUTA ELEKTRONNOGO UPRAVLENIYA MASHIN [Works of the Institute of Control Computers] in Russian No 7, 1978 pp 101-107

LEVINA, G. A. and MART'YANOV, A. V.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.180 by V. Ya. Solovov]

[Text] Images as a form of presenting information play an important role in modern science and technology, as both the object and result of research. The problems and techniques involved in image processing are analyzed, as are the algorithms common to a broad range of users. Algorithms for the generation and processing of half-tone images are investigated in particular. Techniques of image processing can be utilized in various domains of science and technology. These domains include astronomy (analysis of stellar and galactic photographs obtained in the visible, IR and UV spectra), physics (analysis of the images of particle trajectories in bubble chambers), biology (analysis of subcellular structures), genetics (analysis of chromosomal images), medicine, crime detection, and analysis of aerial and space photographs. Tables of the application of specific half-tone image processing algorithms pertaining to particular domains of application are presented. The structure of a program package incorporating elements of techniques used by a broad range of users is proposed. References 13. [131-1386]

1386
CSO: 1863

USSR UDC 681.322.06:519.68

ONE APPROACH TO THE AUTOMATION OF MICROPROGRAMMING

Moscow TRUDY MOSKOVSKOGO ENERGETICHESKOGO INSTITUTA in Russian No 343, 1977 pp 19-23

NEVZGODIN, V. P.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B101 by V. T. Mitroshina]

[Text] An approach to the solution of the problem of automating devices which are realized in a fixed set of functional assemblies is proposed. The following are used as the initial data: a functional graph of the operational device (OU) obtained through macrosynthesis; the set of operation algorithms, which are executed in the operational device; a fixed set of functional assemblies which comprise the operational device. The microprogramming task is broken down into two major independent subtasks. The first portion is content oriented, and includes the set of combined microoperations, while the second is address oriented and defines the order for the execution of the microinstructions (MK's). The planning of the contents portion of the microprograms comprises the first subtask and the planning of the address portion comprises the second. The specification of the functional algorithms in the form of a sequency of states of graph vertices is utilized in solving the first subtask, in particular, in solving the following problems: the determination of the set of microinstructions; the generation of the matrix of microinstructions; the determination of the combined microoperations; the determination of the format and manner of coding of the microinstructions; and the coding of the contents portion of the microprograms. References 3.
[442-8225]

8225
CSO: 1863

USSR UDC 681.322.192

AUTOMATINC THE ANALYSIS OF COMPLEX SYSTEM RELIABILITY

Moscow TRUDY MOSKOVSKOGO ENERGETICHESKOGO INSTITUTA in Russian No 343, 1977 pp 46-49

LADYGIN, I. I.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B49 by V. T. Mitroshina]

[Text] The questions of designing a set of algorithms intended for studying the reliability of computers subjected to both dropouts and failures are treated, where these computers are capable of restoring and changing their reliability characteristics with time, and for systems with a variable structure, as well as with a ready standby. The universal algorithm developed for the study of system reliability, where the systems consists of components with different types of standby, is set up for the modeling of a specific system, by means of specifying the so-called set-up data. The set-up data are the number of components in the system, the time during which the system reliability is determined, the type of standby for the components and their reliability characteristics. To compute the reliability of each component, the program turns to an appropriate standard routine which realizes one of the analytical solutions. The algorithm is intended for the determination of the mean time before failure and the failure free service time of systems of any configuration. Figures 2; references 2. [442-8225]

8225
CSO: 1863

USSR UDC 681.322.066

THE BSX MODULAR SOFTWARE SYSTEM FOR THE M-400 MINICOMPUTER

Riga VYCHISLITEL'NYYE KOMPLEKSY V SISTEMAKH AVTOMATIZIROVANNYKH NAUCHNYKH ISSLEDOVANIY in Russian Zinatne Publishers 1977 pp 202-214

KOZLOV, S. S., KUPENKO, A. V. and STUPIN, YU. V.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B127]

[Text] The BSX software system is intended for the automation of physical experiments in real time. It allows for automated control of the running of programs on the M-400 and contains routines for working with displays, electronic modules designed to CAMAC standards, and input/output devices. Systemic, scientific and other programs are included in its complement. References 10.
[442-8225]

8225
CSO: 1863

USSR UDC 681.322.01

A PROGRAM SIMULATOR FOR A SMALL COMPUTER

Riga VYCHISLITEL'NYYE KOMPLEKSY V SISTEMAKH AVTOMATIZIROVANNYKH NAUCHNYKH ISSLEDOVANIY in Russian Zinatne Publishers 1977 pp 160-166

KAVCHENKO, A. V., KARLOV, A. A., POLYNTSEV, A. D. and SMOLYAKOVA, T. F.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B18]

[Text] The logic capabilities, design principles and operating characteristics of a simulator for the M-6000 computer are treated: programs which simulate the operation of a small M-6000 computer on the BESM-6 and CDC-1604A computers. The application of the simulator allows for the debugging of small computer programs using all of the advantages of large machines (card equipment, wide printout, the capability of the simultaneous operation of several users, etc.). References 2.
[442-8225]

USSR UDC 681.32.06:620.1.08

PROGRAMMING SYSTEMS FOR PRIMARY DATA PROCESSING FOR THE M-6000 PROCESS CONTROL COMPUTER

GODISHN. TSENTR. LAB. AVTOMATIZ. in Bulgarian No 2, 1976 (1977) pp 95-105

BURILKOV, T., PACHEV, G., KONDRATEVA, G. and ILIYEV, R.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B105]

[Text] The program system for primary data processing for control computers of the M-6000 ASVT [modular system of computer technology] type, designed in the Central Laboratory for Automation (Bulgarian People's Republic) is described. Figures 2; tables 1; references 4.
[442-8225]

8225
CSO: 1863

USSR UDC 681.3.06

A DIALECT OF THE OGRA-ALGOL GRAPHIC LANGUAGE

Moscow VYCHISLITEL'NAYA TEKHNIKA V MASHINOSTROYENII. NAUCHNO-TEKHNICHESKIY SBORNIK in Russian No 3, 1977 pp 117-122

SHUB, L. I.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B162 by S. G. Zuyev]

[Text] A dialect of the OGRA-ALGOL graphic language is described which is intended for writing the operators which form graphic images in programs compiled in the ALGOL language for M-222, BESM-4M and M-220 computers as applied to the TA-1M translator. The graphic language operators are introduced into the translator in the form of special subroutines incorporated in the IS-2. As a result of running the program which contains the dialect operators, portions of the graphic information are generated in the OGRA-O language, which are formatted in accordance with the requirements of the basic software for the ITEKAN-2M automated drawing and graphing

unit. The structure of the library of special subroutines which was developed, the purpose of the individual subroutines and the ALGOL treatment of them are given. Tables 1; references 2.
[442-8225]

8225
CSO: 1863

USSR UDC 002.53

ON A METHOD FOR NATURAL-LANGUAGE INTERACTION WITH DATA BASES

Novosibirsk ASU "SIGMA"--SISTEMA UPRAVLENIYA PROMYSHLENNYMI PREDPRIYATIYAMI [The "Sigma" Automatic Enterprise Control System] in Russian 1978 pp 97-103

LEVIN, D. YA., MASHUKOV, YU. G. and NARIN'YANI, A. S.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 10, 1979 Abstract No 10 I219 by O. Vysochanskaya]

[Text] The basic design principles of traditional means of operation of data bases, divided into inquiry identification means and data retrieval means, are considered.

The means of elementary processing of information for interaction with data bases usually are represented by algorithms realizing computational procedures of the data output type, their comparisons, the determination of means, maxima, or minima, refinement or correction of data, etc.

An interdisciplinary team from the NIIsistem [Scientific Research Institute of Systems] and the Computer Center of the Siberian Affiliate of the USSR Academy of Sciences is investigating the use of natural language for interaction with computer systems. A system for natural-language communication with data bases has been developed as a specific research application.

The purpose of that development was to assure a high degree of the flexibility--inherent in natural languages--of formulation of inquiries, precision and operativeness of identification of inquiries, and formation of laconic and exhaustive answers. The system may be regarded as a semi-integrator that translates the text of the inquiries into an intermediate semantic representation and interprets that representation as a working program.

The data yielded by the conducted experiments served to formulate the following conclusions: The use of natural languages for interaction with data bases serves to simplify the operating qualities of the system, enhance system accessibility, broaden the range of users, and reduce setup cost.

This interaction principle appears to be maximally effective with respect to the data bases containing information for a broad range of users. References 2.
[155-1386]

1386
CSO: 1863

USSR UDC 025.4.036

EXPERIMENTAL DATA BASE WITH NATURAL-LANGUAGE INTERFACE

Novosibirsk VZAIMODEYSTVIYE S EVM NA YESTESTV. YAZ. [Natural-Language Computer Interfacing] in Russian 1978 pp 96-120

STEPANOV, A. M.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 8, 1979 Abstract No 8 I288 by O. V.]

[Text] An experimental conversational system is described. The system consists of a data base and several units serving to interact with it on the basis of a natural-language subset: a translation unit, a recording unit, a retrieval unit, and a response-shaping unit. The translation and retrieval units realized on a BESM-6 computer are described. References 4.
[120-1386]

1386
CSO: 1863

USSR UDC 681.322.06:517.91

THE USE OF SYNTACTIC TABLES FOR THE INTEGRATION OF DIFFERENTIAL EQUATIONS

Moscow PROGRAMMOMIROVANIYE in Russian No 5, 1977 pp 63-69

BONDAR', A. YU. and KATKOV, V. L.

[From REFFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract 5B83. Summary]

[Text] A method of classifying differential equations is proposed, which is based on the utilization of a descending, irrevocable method of syntactic analysis, which is realized in the form of syntactical tables. The implementation of the method is briefly described and the results of test calculations are given. Figures 6; references 3.
[442-8225]

8225
CSO: 1863

USSR UDC 681.322.068

THE PRINCIPLES OF TRANSLATION SYSTEM DESIGN FOR PARALLEL COMPUTING MACHINES

Moscow PROGRAMMIROVANIYE in Russian No 5, 1977 pp 40-52

PRONINA, V. A. and TRAKHTENGERTS, E. A.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B136]

[Text] The translation system of a multiprocessor computer system is analyzed, where the translation system provides for both deparalleling of the translation process itself and the capability of parallel execution of the target program obtained. A parallel-series method of syntactic analysis is proposed which is based on the utilization of precedence functions. Figures 3; tables 1; references 10.
[442-8225]

8225
CSO: 1863

USSR UDC 681.327:002.513.5

THE SOFTWARE FOR GRAPHIC DATA OUTPUT AS APPLIED TO THE ITEKAN-2M AUTOMATED DRAWING AND GRAPHING UNIT AND THE M-222 COMPUTER

Moscow VYCHISLITEL'NAYA TEKHNIKA V MASHINOSTROYENII. NAUCHNO-TEKHNICHESKIY SBORNIK in Russian No 3, 1977 pp 36-40

SHUB, L. I., YEGOROV, V. A. and TIMOSHCHUK, V. S.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B163 by S. G. Zuyev]

[Text] The set of programs for the basic software (MO) and the specific features of programming drawings on the M-222 computer for the ITEKAN-2M automated drawing and graphing unit are described. The component parts of the software are: the drawing description language, the library of typical images, the processing programs, the "dispatcher" program and the tie-in program. The software was developed as applied to drawings in the machine construction specialty, however, it allows for sketching various components in a plan view, something which makes it possible to use the structural designs of technological, construction, electrical engineering and other equipment in practice without substantial additional work. The library of standard images is compiled for each specific design plan, while the remaining components are of a universal nature and comprise the basic software. The conversion of the graphic information specified in the input language to the instructions of the playback unit is accomplished by means of successively reprocessing the original data from a higher level representation in the computer, to a lower level. The lowest level corresponds to the instructions of the playback unit, and is fed out from the computer on punched tape. A description of the procedures for processing graphic information all levels of its conversion is given. References 1.
[442-8225]

8225
CSO: 1863

USSR UDC 681.513.5:519.272

ORGANIZATION OF COMPUTATIONAL PROCEDURE AND THE METHOD OF STOCHASTIC SYNTHESIS OF OPTIMAL CONTROL

SBORNIK TRUDOV. INSTITUT PROBLEM UPRAVLENIYA [Collected Works, Institute of Control Problems] in Russian No 15, 1978 pp 5-12

ALESHCHENKO, G. M.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.114. Summary]

[Text] Algorithms for the solution of the Cauchy problem are considered with respect to the method of stochastic synthesis of optimal control. Sample solutions of optimization problems are presented. Figures 2; references 3.
[131-1386]

1386
CSO: 1863

USSR UDC 681.719.512

DATA BANK RECODING PROGRAMS FOR TELETYPE TRANSMISSION

Tashkent ALGORITMY [Algorithms] No 37, 1979 pp 33-39

ABLUGAFAROV, A.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.169 by T. M. Kuznetsova]

[Text] Programs designed for the recoding and editing of octal, decimal, and character-type data banks so as to transfer them from the "Minsk-32" computer tape code to the international telegraph code M-2 (MTK) with printout of data on 5-track punch tape are described. These programs are used for data exchange between automated systems via teletype. The names of these programs are TPLML and TMLPL and the programming language is YaSK. The programs also are designed for performing the above operations in converse order. Tables 2; references 2.
[131-1386]

1386
CSO: 1863

USSR UDC 681.51:519.876

DECOMPOSITIONAL APPROACH TO THE OPTIMIZATION OF INVESTMENT PROGRAMS

SBORNIK TRUDOV. INSTITUT PROBLEM UPRAVLENIYA [Collection of Works, Institute of Control Problems] in Russian No 15, 1978 pp 41-51

VOYEVODINA, YE. B.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.495]

[Text] The utilization of the Benders decomposition method for the optimization of investment programs is considered; this serves to resolve large-dimension problems. Figure 1; references 2.
[131-1386]

1386
CSO: 1863

USSR UDC 025.43:681.3

CONCERNING THE POSSIBILITY OF AUTOMATED CONSTRUCTION OF THESAURUSES IN A DIALOGUE MODE ON THE BASIS OF RELATIVE ALGEBRA

Kiev In-t kibernet. AN USSR Preprint No 82, 1978 pp 26-40

DRIYANSKIY, V. M. and KOLISNIKOV, N. G.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 8, 1979 Abstract No 8I253 by O.V.]

[Text] The processes of construction of data retrieval thesauruses (IPT) are divided into manual, automated and automatic. The methods of automatic construction are based on the statistical analysis of the ability to find (vstrechayemost') and the coability to find key words (KC) in documents of the object region, which leads to a low adequacy of concept of the model because of the relations between descriptors which are frequently incorrectly established. However, during projection of data retrieval systems, the relations between descriptors reflected in the IPT must be caused solely by the significant content of descriptors and must have an objective nature.

The method of semiautomatic construction of thesauruses is described. For this goal the apparatus of relative (relatemnoy) algebra is used which achieves the deductive construction of the relations between concepts of the basis of those available. An algorithm is presented which applies the proposed approach to a solution of the problem. For a solution of indeterminate situations feedback by a projected thesaurus is used. References 6. [120-6415]

6415
CSO: 1863

USSR UDC 681.51:519.876

ANALYSIS AND SYNTHESIS OF THE FUNCTIONING MECHANISMS OF TWO-LEVEL SYSTEMS WITH DIFFERING INFORMATION CONTENT OF THE CENTER

SBORNIK TRUDOV. INSTITUT PROBLEM UPRAVLENIYA [Collection of Works, Institute of Control Problems] in Russian No 15, 1978 pp 55-58

ANDREYEV, S. P. and KONDRAT'YEV, V. V.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.496]

[Text] Analysis and synthesis of the functioning mechanisms of a two-level active system in the presence of a nonparameterized description of element models are conducted. References 5.
[131-1386]

1386
CSO: 1863

APPLICATIONS

SIBERIAN DIVISION OF ACADEMY OF SCIENCES IMPROVES TIES WITH INDUSTRY

Moscow NAUKA--NARODNOMU KHOZYAYSTVU in Russian 1979 signed to press 16 Feb 79 pp 18-40

[Article by Academician G. I. Marchuk: "Scientists of Siberia for the Nation" in the book "Nauka--Narodnomu Khozyaystvu" (Science for the National Economy) edited by I. M. Pospelova, Izdatel'stvo Sovetskaya Rossiya]

[Excerpts] The development of 1,600 automated control systems during the Ninth Five-Year Plan marked the beginning to a new search, the forming of scientific bases, and the finding of ways for rational management at the enterprises, starting with accounting and ending with operational management. During the Tenth Five-Year Plan, the representatives of science and industry have continued to solve these difficult but exceptionally important problems.

About 10 years ago, even before the mass use of ASU [automated control system] began in the nation, the then director of the Barnaul Radio Plant arrived at our Computer Center. He came and said: "Develop a system so that I can know what is being done at my plant. The planning department provides one answer, the marketing department another, the bookkeeping office a third, and each handles the figures in its own manner. As a result I have no accurate information which would allow me to manage things."

We concluded a cooperation contract with the Barnual Radio Plant. Involved in the work, in addition to the Computer Center, were the Institute for the Economics and Organization of Industrial Production and the Systems Scientific Research Institute of the Ministry of Instrument Building. Over the 7 years these institutes, together with the plant, developed the Barnual system. This system monitors, records and keeps the accounting records, it provides the necessary information, it controls the output of new products, and much else. A possibility has arisen of analyzing the course of production on all levels and to take decisions efficiently. As a result there has been a sharp reduction in losses, the material consumption rates have been reduced, labor productivity has risen, and the coefficient for steady product output has risen from 0.54 to 0.75-0.80.

In 1971, the system was reviewed by the ministry board and was accepted as a standard one for the enterprises of the ministry.

At present the Barnual ASU is in use and without the participation of scientists is being introduced at 103 enterprises of the nation. On the basis of this system, for third-generation computers the universal and adapting Sigma ASU has been developed, and this is a new step ahead on the path of widely using the ASU in the Siberian economy. Here is the second example showing how the promising development of scientists finds its way into the entire sector.

10272
CSO: 8144/0433

USSR UDC 681.324

A STUDY OF THE TECHNICAL AND FUNCTIONAL PARAMETERS OF THE BAT SUBSCRIBER SYSTEM

Warsaw PRACE NAUKOWE INSTYTUTU CYBERN. TECHN. PWR in Polish No 51, 1977 pp 63-73

BORATYN VLADISLAV, SUSKEVICH MARIAN and MRUGALA BOLESLAV

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B60 by L. M. Gvozdeva]

[Text] The CABAT subscriber network provides many users with access to the BAT system (computer system for data processing of the Warsaw Military Engineering Academy). The purpose of CABAT is to facilitate and assure free access to the computer and reduce the computation time. The system is equipped with an ODRA-1305 central processor, an MPX-325 multiplexer, modems, telephone channels, and peripherals (MERA-302, MERA-303, MERA-306 minicomputers, etc.). The multiplexer services up to 20 terminals. Data transmission is possible via telephone channels at a rate of 1,200 - 2,400 bauds. The system operates under the control of the MINIMDP-2 operating system. The composition of the indicators to assess the effectiveness of the subscriber network (the average time for system response, the average number of subscriber, the average queue of assignments, the probability of engaging the central processor at any point in time, etc.) were adopted as the

requisite parameters in the modeling of the subscriber data transmission system. The purpose of the modeling was to find the best way of consumer operation of the system, and to find optimum methods of expanding and improving it. The primary research tool was taken as the simulation model. Analytical models based on queueing theory are used to describe the individual components of a system. Analytical simulation modeling encompasses the investigation of all of the technical and functional parameters of the CABAT system and is suitable for the planning of large collective use computer systems. A text is drawn up for a simulation program. The SIMULABAT language is used in the simulation model. Figures 4; references 6.
[442-8225]

8225
CSO: 1863

USSR UDC 681.324

THE POLRAX-2 SYSTEM AND THE SERVICING NETWORK

Warsaw PRACE NAUKOWE INSTYTUTU CYBERN. TECHN. PWR in Polish No 51, 1977 pp 149-157

MUSZYNSKI JANISLAW and GORAL STANISLAW

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B61 by Yu. V. Vyaznikov]

[Text] A brief description is given of the POLRAX-2 computer system, which is in service in the Data Processing Center in Wrotslava (Polish People's Republic). The system is designed around ODRA-1305 computers and uses the GEORGE 3 operating system. Besides the standard terminals of the IBM company, included in the POLRAX-2 system complement are RC2200, RC3600 and RC5500 small computers. Sets of instructions and macroinstructions, as well as standard program packages are available to the users. Moreover, they can make use of their own program packages. The creation of a regional information computer network is being planned on the basis of the POLRAX-2 system. In the first stage, the network will combine computer systems using ODRA-1305 and GEORGE 3 type computers. Later, it is planned that the system will be coupled to ODRA 1300, IBM 370, ICL 2403 and RC 3600 computers. Figures 4.
[442-8225]

8225
CSO: 1863

USSR

UDC 681.335.2

THE INFLUENCE OF THE ECCENTRICITY OF CODE MASKS ON THE PHASE ERROR OF RASTER INTERPOLATORS

Moscow SBORNIK NAUCHNYKH TRUDOV PO PROBL. MIKROELEKTRON. MOSKOVSKIY INSTITUT ELEKTRONNOY TEKHNIKI in Russian No 31, 1976 pp 118-123

FROLOV, G. I., CHISTOV, V. N., TOPIL'SKIY, V. B. and NEDOPEKIN, K. K., Moscow Electronics Engineering Institute

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B580. Summary]

[Text] The influence of the positioning of the read windows and the alternation of the phases on the magnitude of the phase error of a raster interpolator is considered, where this is caused by the presence of eccentricity in the setting of the circular code scales. The results obtained can be used in the design of high precision converters of angular displacement to digital code. Figures 4; references 2.
[442-8225]

8225
CSO: 1863

USSR

UDC 025.4

EFFECTIVENESS OF INFORMATION SYSTEMS INTERACTION AND THE LINGUISTIC SOFTWARE FOR THE AUTOMATED INFORMATION RETRIEVAL SYSTEM OF THE LIBRARY OF THE USSR ACADEMY OF SCIENCES

SBORNIK NAUCHNYKH TRUDOV BIBLIOTEKI AN SSSR I AN SOYUZNYKH RESPUBIK [Collection of Scientific Works, Library of the USSR Academy of Sciences and of the Union Republic Academies of Sciences] in Russian No 5, 1978 pp 190-199

PANOV, A. A. and SUKHMANEVA, YE. G.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 10, 1979 Abstract No 10 I209 by L. Amiragova]

[Text] The effectiveness of theuse of means of automation in library information processes consists in the regular and operative production and exchange of tape-recorded data bases and in their provision to information

centers. The interaction, coordination, and cooperation of the data base-exchange activities of the automated centers are essential.

The project for the AS-BAN (Automated System of the Library of the USSR Academy of Sciences) provides for utilizing the data bases of the VINITI [All-Union Institute of Scientific and Technical Information], the VKP [All-Union Book Chamber], the INION [Institute for Scientific Information on the Social Sciences], the GPNTB [State Public Scientific and Technical Library], and the GBL [Lenin State Library]. If the magnetic tapes from the central information agencies are to be effectively utilized by other agencies without additional processing, they should not only be based on matching communication formats and computer programs but also on compatible information retrieval languages.

Elements of information retrieval languages that have to be compatible to a certain extent in order to consider the languages compatible are enumerated. As part of the concept of linguistic software for the SATSsNTI (Automatic Central Scientific and Technical Information System), special compatibility tables are proposed for conversion from the VIK (All-Union Information Classification) and the All-Union Information Retrieval Thesaurus to other languages (UDK, BBK).

It is doubted whether it is economical to develop compatibility tables on the spot at each center, or even to develop such tables on a centralized basis. An alternative is proposed, namely, that the central information agencies should include indexing in UDK and BBK languages in the recording media. This idea is considered on using the planned AS-BAN as an example. References 9.
[155-1386]

1386
CSO: 1863

USSR

UDC 621.385.832.5

USING MINI-COMPUTER SARATOV-2 TO PROCESS SPECTROANALYTICAL INFORMATION

Minsk ZHURNAL PRIKLADNOY SPEKTROSKOPII in Russian No 6, 1979 p 1078

[English abstract from source] BULAYEVSKIY, I. D., GUBANOV, V. A., and LAPOTNIKOVA, L. K.

[Text] A brief summary is made of the main trends in automatization of the spectrophotographic data input into a computer. A recent tendency is noted towards application of transmitting TV-tubes with different characteristics. A description is given of the information-measuring system, based on a ≤Saratov-2≥ minicomputer, where a TV-analyser with a vidicon is used as a device for the input of spectrograms. The characteristics of the system are studied. The description of the main functional assemblies of the analyser and the results of spectrogram processing are described. Good prospects for application of transmitting TV-tubes as a block for input of spectrograms into the computer are emphasized.

CSO: 1863-P

CONFERENCES

THIRD SUMMER SCHOOL FOR YOUNG PROGRAMMERS

Moscow PROGRAMMIROVANIYA in Russian No 3, 1979 pp 90-91

[Article by G. A. Zvenigorodskiy]

[Text] The third summer school for young programmers was held in Akademgorodok in Novosibirsk from 2 June to 7 July 1978. It was organized by the Scientific Council for Problems of Education under the presidium of the Siberian Department, USSR Academy of Sciences, the computer center of the Siberian Department, USSR Academy of Sciences and Novosibirsk State University. Participating in the work of the school were over 150 students in the fifth to tenth grades from 22 oblasts, krays and republics of the USSR. Some of them had studied programming earlier, but there also were new ones who encountered computer technology for the first time at the summer school. Therefore the classes were organized in three different flows, depending on the qualifications of the students. The classes were conducted by specialists of the computer center of the Siberian Department, USSR Academy of Sciences, and Novosibirsk State University. The Vice-President of the USSR Academy of Sciences, Chairman of the Siberian Department of the Academy; G. I. Marchuk; Scientific Leader of the School, Corresponding Member of the USSR Academy of Sciences, A. P. Yermov; Vice-rector, Novosibirsk State University, Professor N. G. Zagoruyko.

In lectures and practical courses the students became acquainted with contemporary languages and programming systems and mastered various forms of work with computers, terminals and perforating equipment.

Side by side with the traditional ALGOL-60 the students mastered the specialized language ROBIK-2, developed especially for the initial instruction of students, became acquainted with the first Soviet realization of the ultra-high level language Setl, and studied packages of programs of machine graphics SMOG and ShPAGA. The ShPAGA graphic package, intended for mastering means of machine graphics, was developed especially for the summer school and was completely implemented by students of grades 6 and 7 who attended the school of young programmers at the computer center of the Siberian Department of the Academy of Sciences. Such languages as BASIC, FORTRAN, PL/1 and COBOL were discussed in faculty sessions.

In spite of the shortness of the school period, most participants in the school, including new students, successfully mastered languages and systems new to them, and in the course of practical sessions in the computer center of the Siberian Department of the Academy of Sciences prepared and debugged training programs in all the studied languages.

In the concluding conference the young programmers exchanged experience in the development of system and applied programs and packages for various purposes. Among system programs, of very great interest was a controlled syntactic interpreter with the dialog language ROBIK-2, developed by Novosibirsk sixth-graders N. Glagoleva and Ye. Kalenkovich and seventh-graders T. Vaynshteyn and S. Nikiforovskiy. The interpreter was written in the Setl language and it had a volume of over 700 operators. Successful selection of an instrumental language and use of modern methods of structural programming permitted the children to adjust all the main units in less than a month and assure a developed diagnosis and built-in program for gathering educational statistics. Two other interpreters--with the computer source language Promin' and the educational autocode MAG-1--were developed by Khar'kov schoolchildren.

Sets of procedures of machine graphics for the BESM-6 computer were presented by two groups of lads. The Khar'kov tenth-graders Ya. Vaysman and N. Rubinshteyn prepared at the order of the Institute of Problems of Machine-Building of the Ukrainian SSR Academy of Sciences set for the issuance of graphic information on an alphanumeric printer. Apparatus of R-functions was used in the procedures of that set. A second set--the above-mentioned ShPAGA (developed by A. Salikhova and N. Sokolova)--permits working with graph plotters.

The two sets are functioning in the Dubna machine station. It is planned to include them in system libraries at corresponding computer centers.

Many applied programs developed by the students of Khar'kov, Alma-Ata, Moscow and Novosibirsk also have great practical importance; some of them have been included in systems for the software of various computer centers. For example, a program for calculation of the ground water regime, compiled by sixth-grader Yu. Shirman, is widely used in the geophysics faculty of Khar'kov University. A program for the organization of book exchange, compiled by Novosibirsk children at the order of the Society of Book Lovers, permits each user in a dialog regime to select a suitable type of exchange and insert in the system information about books proposed for exchange.

Schoolchildren from Alma-Ata told about several programs to monitor the knowledge of students. Tenth-grader A. Aleksandrov from Moscow reported on his program for modeling biochemical processes on the "Mir-2" computer. Rapid retrieval of the meaning of a word in a dictionary is assured by a program written in the Setl language. The dictionary is stored on tape or disk and can be suppliemented by the user during work. The author of that program, Natasha Kirpotina from Novosibirsk, recently celebrated her ninth birthday.

The results of the conference showed that students are capable by their own efforts of solving fairly complex tasks in the area of software development. The most interesting reports and programs will be published in a collection to be published at the suggestion of Academician G. I. Marchuk.

The work of the third summer school of young programmers proceeded under the general scientific and methodical supervision of the laboratory of experimental information science of the computer center of the Siberian Department of the USSR Academy of Sciences. The procedure of teaching programming and software used in the work of the school were in essence an approbation of the results obtained in the group of school information science of that laboratory.

2174
CSO: 1863

ALL-UNION SCHOOL SEMINAR ON THEORETICAL AND APPLIED QUESTIONS OF SYSTEMS PROGRAMMING

Kiev KIBERNETIKA in Russian No 3 1979 pp 114-115

[Article by M.G. Gontsa and G.Ye. Tseytlin]

[Text] The All-Union School Seminar on Theoretical and Applied Questions of Systems Programming, which was organized by the Institute of Mathematics and VTs [Computer Center] of the Moldavian SSR Academy of Sciences, was held in the village of Vadu-luy-Vode near Kishinev from 3 to 6 December 1978. A total of 120 specialists from Moscow, Kiev, Minsk, Kishinev, Novosibirsk, Vladivostok, Kazan', Khar'kov, and other scientific centers throughout the country participated in the school seminar. Among them were representatives of the Moscow, Kiev, Kishinev, Khar'kov, and Kazan' State Universities. Academic science was represented by people from the USSR Academy of Sciences' Institute of Precision Mechanics and Computer Engineering, the USSR Academy of Sciences' VTs, the USSR Academy of Sciences' Institute of Control Problems, the Moldavian SSR Academy of Sciences' Institute of Mathematics and VTs, the Ukrainian SSR Academy of Sciences' Cybernetics Institute, and the Ukrainian SSR Academy of Sciences' Physicotechnical Institute of Low Temperatures.

The school seminar's program consisted of 5 plenary reports and 24 reports on urgent questions of theoretical and applied systems programming.

Plenary Reports

In his report [1], Professor V.N. Red'ko, doctor of physical and mathematical sciences and the leader of the seminar, disclosed the essence of the composition programming method, which is a further development of the concept of structural programming and its various branches. He discussed the basic classes of compositions, which are divided into connotative and

denotative on the basis of the method used to describe a program's structure. He emphasized the possibility of using composition programming in the solution of problems of formalizing the semantics of programming languages, optimizing programs and establishing their complex characteristics, and so on.

In report [2], the use of the composition programming method to formalize the language of a series of language constructions was examined. Name sets -- an analog of address mapping -- were advanced as a convenient means for describing data structures. In such sets there are definitions of the functions (and their superposition) in terms of which the data structures and the mechanisms for processing them are described. The proposed apparatus is used in describing the semantics of the assignment statements of mathematical and logical expressions, distributive structures, cycles, and so forth.

In report [3], there was an analysis of the factors that confirm the prospects for developing multilanguage translating systems on the basis of a compositional approach. A project for a multilanguage, syntactically controlled system with three-level assignment of the languages' semantics (external, oriented on the strategy of realization, and machine-oriented) was proposed. There was also a discussion of the problems involved in creating programmed constructors that translate the description of the languages' semantics from the external level into an abstract machine language with an orientation toward insuring the mobility of the multilanguage processors.

In report [4], there was a discussion of abstract models of multiprocessor computing systems oriented on symbol multiprocessing. Special attention was given to the strategies of bilateral and multilayer parallel processing of input programs. The results of a theory of parametric models of language processors oriented on nontruncated bilateral and multilayer syntactical analysis were presented. In the report there was also a proposal for methods of performing symbol multiprocessing on a tree-shaped, homogeneous, automatic network that consists of mul'tistekovyye [translation unknown] automatic modules. The results obtained have been used in a model of a conveyor-type parallel translator that was developed at the Ukrainian SSR Academy of Sciences' Cybernetics Institute.

Report [5] was devoted to theoretically multiple language models based on the calculus of first-order predicates. Such a model is a triad: the calculus of predicates, theory and axiomatics. The computation process is characterized by a dynamic change in the state of the model in the direction of its construction of a noncontradictory interpretation. The proposed approach is illustrated with examples of the description of

systems processes that arise during the solution of the problem of parallel translation. A theoretical multiple model that formalizes the semantics of the "Milan" language has also been constructed.

Questions on the Formalization of the Syntax and Semantics of Programming Languages

Reports [6] and [7] were devoted to developing the concept of syntactical control.

In [6], there is a proposal for an original approach to the interactive construction of programs on the basis of an automated system with extremely flexible means of syntactical control.

The combination of the concept of syntactical control with the method of (Knut's) attributive grammars, in relation to the development of systems for constructing translators, was discussed in [7].

Report [8] was devoted to the development of an apparatus for equivalent transformations of parametric grammars, with due consideration for the agreement of the syntactical and semantic descriptions of the language constructions.

Report [9] proposed an algorithm for constructing an invariant of the cycle for simple ALGOL-like structures in connection with the problem of program verification.

The problem of the formalization of the semantics of programming languages with the enlistment of the apparatus of the theory of relationships and the calculus of predicates was the subject of reports [10] and [11].

In report [12], there was a discussion of the questions of formalizing the semantics of nonprocedural languages in terms of macrodescriptions based on an algorithmic language.

Dialog Systems and Data Bases

In report [13], the technology for the realization of dialog languages based on hierarchical centralized control, using the LYaPAS-M [logical language of synthesis algorithm representation, variant M] instrument system, was developed.

In report [14], there was a discussion of the problems involved in creating complex groups and packages of modulus-type programs using a dialog regime on terminals of a YeS-7906 computer.

The experience amassed in creating, operating and developing a dialog programming system for analytical transformations of SIRIUS, which was one of the first such systems in the USSR and which is now widely used, was discussed in report [15].

Report [16] contained a discussion of questions of dialog interaction in languages that are close to natural.

Report [17] explained the use of the apparatus of abstract data structures when designing modulus-type software systems.

In report [18], there was a discussion of questions on the use of a specialized language and programming facilities for the creation and modification of multipurpose information systems.

On the basis of algebraic structures, in report [19] there were proposed means for describing algorithmic processes related to the processing of tables of data.

Report [20] was concerned with several questions on the realization of means for controlling data bases.

Questions on the Realization of Programming Systems

Questions on the development of software for highly productive multiprocessor computers were discussed in [21] and [22].

Report [21] contained a proposal for a parallel translation method, on the basis of which a multilanguage translating system (FORTRAN and RL/1) for a computer with a reorganizable structure is being developed.

The designing of a parametric, syntactically controlled translating system (with languages PASCAL, SOL, SEMOL, INC) for the "El'brus" computer was the subject of report [22].

In report [23], there was a discussion of the FORTRAN standard and some problems of its software.

Reports [24] and [25] were devoted to several questions concerning the designing of software for the Unified System of Computers.

In report [24], there was a discussion of the expanding system of machine graphics, while in [25] there was an examination of the temporal planning and program starting system.

Reports [26]-[29] were devoted to the development of software for minicomputers.

In reports [26]-[28], there were discussions of techniques for planning and realizing minicomputer software facilities with the help of instrument systems realized on large, general-purpose computers.

Report [29] was concerned with a multiphase compiler with an RL/1 subset for the M-5000 and M-5100 minicomputers that combines the convolution and scanning strategies of syntactical analysis.

Panel discussions on the subjects of program verification and programming technology were also held.

The problem of program verification was the subject of addresses given by V.N. Red'ko, M.G. Gontsa, G.Ye. Tseytlin, A.S. Kleshchev, A.N. Biryukov, K.N. Yefimikin, and others. They discussed questions relating to the verification of REFAL programs, requirements for formalism oriented to the solution of verification problems, and other subjects.

Different aspects of programming technology and the formation, development and programming support that are related to it were discussed by A.L. Aleksandrov, A.S. Kleshchev, Ye.A. Zhogolev, G.Ye. Tseytlin, M.G. Gontsa, and others.

The school-seminar's recommendations underlined the need for intensive research into the problem of integrated formalization of programming languages. Mention was made of the fruitfulness of composition programming as a technological device for creating and introducing into practice efficient translating, interpreting and other types of programming systems in large and small computers.

During the school seminar there was a fruitful exchange of experience, ideas and viewpoints on the basic problems of theoretical and systems programming that will contribute to the further intensive development of this important area of modern cybernetics.

LIST OF REPORTS

Plenary Reports

1. Red'ko, V.N. (Kiev), "Composition Programming (Prerequisites, Achievements, Prospects)."

2. Byts', V.V., Manakova, Ye.I., and Nikitchenko, N.S. (Kiev), "Some Questions on the Formal Assignment of Programming Languages."

3. Gontsa, M.G. (Kishinev), "Multilanguage Processors and Semantic Constructors."

4. Tseytlin, G.Ye., and Yushchenko, Ye.L. (Kiev), "A Theory of Parametric Language Models and a Network of Parallel Automatic Units."

5. Kleshchev, A.S. (Vladivostok), "Relational Models of Programming Languages and Parallel Translation."

Questions on the Formalization of the Syntax and Semantics of Programming Languages

6. Zhogolev, Ye.A. (Moscow), "Syntactically Controlled Program Designs."

7. Kurochkin, V.M., and Serebryakov, V.A., "A Syntactically Controlled System Oriented on a System for Constructing Translators."

8. Kuzemko, V.F. (Kiev), "On Syntactical Transformations and the Problem of the Agreement of Syntax and Semantics."

9. Biryukov, A.N. (Moscow), "On One Transformation of Cycle Operators."

10. Korostina, N.K. (Vladivostok), "A Polymodal Method of Determining the Semantics of Languages."

11. Kritskiy, S.P. (Rostov-na-Donu), "An Axiomatic Approach to Describing Contextual Conditions."

12. Dmitriyeva, Ye.V. (Vladivostok), "A Macroprocessor as a Means of Realizing Nonalgorithmic Languages."

Dialog Systems and Data Bases

13. Zakrevskiy, A.D., and Toropov, N.P. (Minsk), "Standard Realization of Dialog Languages Based on PS-LYaPAS-M."

14. Lavrishcheva, Ye.M., Vishnya, A.T., Grishchenko, V.N., and Morentsova, Yu.I. (Kiev), "Principles of the Development and Techniques for the Modulus Planning of Program Groups and Packages."

15. Belous, L.F. (Khar'kov), "The SIRIUS-SPUTNIK System."

16. Shevchenko, V.V. (Khar'kov), "On Conversational Communication With a Computer."

17. Podshivalov, D.B., and Podgornova, S.L. (Moscow), "On Several Principles of Systems Programming."

18. Zamulin, A.V. (Novosibirsk), "Planning Information Systems on the Basis of an Oriented Algorithmic Language."

19. Gnedenkov, L.N. (Kazan'), "A Language for Macrodescriptions of Processes That Is Based on the Algebra of Tabular Relationships."

20. Kevarkov, A.A. (Moscow), "On Automating the Translation of One Type of SUBD [system for control of data bases] Languages."

Questions on the Realization of Programming Systems

21. Marichuk, M.N., and Pronina, V.A. (Kishinev, Moscow), "Parallel Translators for a Computer With a Reorganizable Structure."

22. Shvets, N.M., and Kozhokar', V.S. (Kishinev), "A Multilanguage Translating System for the 'El'brus' Computer."

23. Aleksandrov, A.L. (Moscow), "On the Standard of the FORTRAN and FORTRAN-4 Languages."

24. Todoroy, D.N., and Kapatsyna, G.G. (Kishinev), "The Expanding Computer Software Systems."

25. Lysyy, S.T. (Kishinev), "An Alarm Clock for Programs."

26. Krasilov, A.A., and Leytes, V.M. (Moscow), "Indirect Software for Minicomputers."

27. Belousov, Yu.A., and Likhachev, V.M. (Moscow), "A Distributive Frame System for Automating the Programming for High-Speed Digital Computers."

28. Khoroshilov, A.I., and Likhachev, V.M. (Moscow), "Organizing Data Control in Complex Systems."

29. Versyatskas, A.I. (Vil'nyus), "A Compiler With an RL/1 Subset for the M-5000 and M-5100 Computer Complex."

[387-11746]

11746
CSO: 1863

REPORT ON A SYMPOSIUM HELD 10-12 APRIL 1979

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA. SERIYA 2 in Russian No 11, 1979 pp 29-30

[Article by V. G. Voyskunskiy and E. A. Shingareva]

[Excerpts] On 10-12 April 1979, the Leningrad Board of the A. S. Popov Scientific-Technical Society of Radio Engineering, Electronics and Communications and the union-wide group "Speech Statistics" conducted a symposium on the linguistic problems of artificial intelligence. The participants were concerned with the following problems: the formation of the most important problems of the linguistic aspects of artificial intelligence, a determination of realistic solution methods, generalization of experience gained and an evaluation of concrete developments.

At the meetings of the "Automatic Text Manipulation and Artificial Intelligence" and "Man-Machine Dialog Systems and Artificial Intelligence" sections, 12 basic reports and 30 communications were heard, which were grouped into three basic categories:

the foundations of artificial intelligence theory;
the processes of generating and interpreting communications;
automatic text manipulation and artificial intelligence.

The symposium adopted a resolution in which recommendations were made to develop the theoretical and applied aspects of the linguistic problems of artificial intelligence. In particular, it was decided, that it would be advisable to request the Scientific Council on the Problem "Artificial Intelligence" of the Committee on Systems Analysis of The Presidium of the USSR Academy of Sciences to examine the question of organizing (within the framework of the Council) an All-Union Project "Industrial Machine Translation in Artificial Intelligence Systems."

[174-9573]

9573
CSO: 1863

UDC [002.5:65.011.56](063)

PROBLEMS IN THE AUTOMATED PROCESSING OF SCIENTIFIC-TECHNICAL INFORMATION (FROM PAPERS OF THE SECOND ALL-UNION SCIENTIFIC-TECHNICAL CONFERENCE)

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA. SERIYA 1 in Russian No 11, 1979 pp 26-30

[Review of conference papers by G. S. Lantsberg]

[Excerpts] The second All-Union Scientific-Technical Conference "Problems in the Automated Processing of Scientific-Technical Information" was held 22-24 November 1978 in Zvenigorod under the joint auspices of the Committee of the All-Union Council of the Scientific-Technical Society for Scientific and Technical Information, VIMI (All-Union Institute of Interindustry Information), VNTITsentr (All-Union Scientific-Technical Information Center) and VINITI (All-Union Institute of Scientific and Technical Information of the State Committee on Science and Technology).

Nearly 400 people from various cities participated in the conference: leading scientists and specialists in computer engineering and data processing, representatives from all-union, republic, branch and territorial information centers (VINITI, VIMI, VNTITsentr, MTsNTI (Moscow Center for Scientific-Technical Information), TsNII "Elektronika" (All-Union Scientific Research Institute "Electronics"), VNII "Informelektro" (All-Union Scientific Research Institute "Informelectro"), VNIIKI (All-Union Scientific Research Institute of Technical Information, Classification and Coding), GOSINTI (State Scientific Research Institute for Scientific and Technical Information) and others), workers from the GKNT SSSR (USSR State Committee for Science and Technology), institutes of the USSR Academy of Sciences, ministries, government departments, scientific research institutes, design bureaus, enterprises,higher educational institutions, NTO's, information organizations, etc.

The conference was opened by an introductory speech by G. S. Pospelov, chairman of the VSNTO (All-Union Council of the Scientific-Technical Society) on Scientific and Technical Information), chairman of the conference's organizing committee and USSR Academy of Sciences corresponding member. In the plenary session, lectures were read by the following people: Yu. A. Mikheyev (GKNT SSSR) "The use of the network of the state system of computer centers for scientific and technical information," assistant chairman of the VSNTO E. A. Pirogov "The participation of scientific-technical societies in the solution of problems in the automated processing of scientific-technical information," A. I. Mikhaylov and I. A. Boloshin (VINITI) "The network of automated scientific-technical information centers (a perspective on their creation and development problems)" in which they set forth the problem of developing a GASNTI (State Automated System for Scientific-Technical Information), the basic needs associated with such networks and an estimate of the possible means of implementation and of the material and technical expenditures.

B. I. Ermolaev, V. S. Lapin and B. S. Ovchinnikov (Scientific Research Center for Computer Engineering) presented a paper on the problem of direct systems of network teleprocessing (OSST) of data from the unified computer system (YeS EVM) and described programs and the direction of research on the creation of a complex for teleprocessing means. They stressed that computer data systems must be constructed in accordance with a multilevel architecture.

In papers presented by GOSINTI, problems were highlighted on the linguistic service for ASNTI (Automated systems for scientific research) networks of TsNTI (Center of Scientific-Technical Information) in the RSFSR (G. A. Tsyganov) and the development of the mathematical software for the IPS "RASPRI-1" (Information retrieval system "RASPRI-1") (E. I. Vdovina et al).

Questions on the mathematical software for the unified computer system IPS "ISIREPAT" (Information retrieval system "ISIREPAT") (L. A. Tolchvoka and S. A. Kozhevnikov) and the IRI system (selective dissemination of information) (V. M. Smirnov) were included in papers presented by the NPO "Poisk" (Scientific Production Association "Search").

The conference noted that the process of introducing ASNTI is, at the present time, hampered and made more complex by insufficient coordination of the work being done on the creation and functioning of ASNTI (in the areas of technology and linguistic, programming and technical support) by all-union, branch, regional and territorial scientific-technical institutes. Organizational-legal and financial problems of magnetic tape service, including the question of providing magnetic tape to lower echelon information agencies, have not been sufficiently investigated. The level of standardization that would provide compatibility of ASNTI and the possibility for the exchange of magnetic tapes in ASNTI networks is inadequate. It was noted that there still exists no unified approach to the construction of IPY (information retrieval languages), which are one of the major components of ASNTI. The present use of various languages, differing little in their potential, in systems with identical purposes is unjustified and measurably complicates wide interaction in a unified information system. Standard problems and procedures of ASNTI for information agencies in correspondence with their functions in the GSNTI (State System for Scientific and Technical Information) have been unclearly formulated. Mismatches and redundancies exist in the development of ASNTI as well as an irrational use of resources and the creation of different systems that are not adaptable to interaction, all of which lowers the efficiency of the operation of the information system and complicates its future development.

The pace of development for packages of applied programs for the solution of information problems lags behind present-day demands. Methods and devices for direct user interaction with the information system (dialog from remote terminals and integrated data bases) are not being introduced adequately.

Industry is still not providing the information centers with the necessary complex of technical devices for operational polygraphy and microfilming, information input and output, and data transmission and teleprocessing.

Unified technical requirements have not been developed for the complex of technical devices for the realization of ASNTI and for separate devices included in this complex. Their development proceeds without account of current and perspective demands for the ASNTI development. There still exists an acute demand for qualified specialists who are needed for the development of AIPS (Automated Information Retrieval Systems) and for the system analysis of problems solvable with the aid of ASNTI.

It was noted at the conference that systems analysis methods for estimating the efficiency of ASNTI have not been fully developed and are little used. The work of providing systems compatibility for telecommunication and associated equipment is not sufficiently coordinated.

[174-9573]

9573
CSO: 1863

USSR UDC 681.51:56.011.65

THE AL'MA-1 NETWORK SYSTEM FOR THE CONTROL OF DATA BASES

Moscow PROGRAMMY OBESPECHENIYA BANKOV DANNYKH. SBORNIK MATERIALOV VSESOYUZNOGO SEMINARA [Data Base Software Programs. Collection of Materials of an All-Union Seminar] in Russian 1979 pp 62-65

VELICHKO, I. V. and FILIPPOV, V. I.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.542. Summary]

[Text] The Al'ma-1 system represents a network-type data base control system based on the proposals of the KODASIL Committee for Scientific and Technical Data. The physical implementation of this system is based on the utilization of the "Mars-6" data file system with the aid of a BESM-6 computer. The system is assembled in the form of a set of procedures written in BESM-6 ALGOL. [131-1386]

1386
CSO: 1863

USSR UDC 681.3.06

PRINCIPLES FOR DEVELOPING SOFTWARE FOR THE FIRST STAGE OF A NETWORK OF AUTOMATED SCIENTIFIC AND TECHNICAL INFORMATION CENTERS

Yerevan TEZY DOKLADOV 9-GO NAUCHNOGO SEMINARA PO SISTEMNYM ISSLEDOVANIYAM GOSUDARSTVENNOY AVTOMATIZIROVANNOY SISTEMY NTI [Abstracts of Papers Presented at the Ninth Scientific Seminar on Systems Research, State Automatic Scientific and Technical Information System] in Russian 1979; Moscow VOPROSY RAZRABOTKI OSNOVNYKH PROYEKTNYKH RESHENIY SETI AVTOMATIZIROVANNYKH TSENTROV NTI [Problems of the Development of Basic Design Solutions for a Network of Automated Scientific and Technical Information Centers] in Russian Part 1, 1979 pp 41-42

POLYUSUK, YU. A.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 9, 1979 Abstract No 9 I331 by V. L.]

[Text] Software for the YeS unified computer system is being developed. An YeS operating system is used as the principal operating system. Of the programming languages used, the most important are Assembler and PL/1. Software is divided into: software for specific automated scientific and technical information systems (ASNTI) and software for organizing interaction between ASNTI and SATsNTI [Automated Central Scientific and Technical Information System]. The development of communicative format has been completed. The results are expressed in the form of two GOSTs [All-Union State Standards]. [131-1386]

1386
CSO: 1863

USSR UDC 681.3.06

SOFTWARE FOR THE TELETYPE SUBNETWORK OF THE AUTOMATIC CENTRAL SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM

Yerevan TEZY DOKLADOV 9-GO NAUCHNOGO SEMINARA PO SISTEMNYM ISSLEDOVANIYAM GOSUDARSTEVNNOY AVTOMATIZIROVANNOY SISTEMY NTI [Abstracts of Papers Presented at the Ninth Scientific Seminar on Systems Research, State Automatic Scientific and Technical Information System] in Russian 1979; Moscow VOPROSY RAZRABOTKI OSNOVNYKH PROYEKTNYKH RESHENIY SETI AVTOMATIZIROVANNYKH TSENTROV NTI [Problems of the Development of Basic Design Solutions for a Network of Automated Scientific and Technical Information Centers] in Russian Part 2, 1979 pp 143-145

AYLAMAZYAN, A. K. and LASKHAREV, YU. YE.

[From REFERATIVNYY ZHURNAL. INFORMATIKA No 9, 1979 Abstract No 9 I328 by V. L.]

[Text] The VNTITsentr [All-Union Scientific and Technical Information Center] as the main organization of the system for automated processing of unpublished information sources, issues orders for copies of primary documents (research reports, experimental designs, dissertations). Requests for the copies are transmitted to the teletypes of the automated information centers of the SATsNTI (automated system for central acquisition of scientific and technical information). To this end, software for YeS computers based on feedback control and the use of a basic telecommunication method for access, has been developed.

The principal purpose of that software is to collect the incoming teletype information into units representing the basic information units of the SATsNTI. The units are transmitted to the network for further processing. [131-1386]

1386
CSO: 1863

PERSONALITIES

USSR UDC 681.51:061

NIKOLAY ALEKSANDROVICH BABAKOR (1912-1978)

Moscow TEORIYA AVTOMATICHNOGO UPRAVLENIYA I REGULIROVANIYA [Theory of Automatic Control and Monitoring] in Russian 1978 pp 224-225

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.8]

[Text] Nikolay Aleksandrovich Babakov was a leading expert in cybernetic engineering in the USSR and the founder of the Chair of Cybernetic Engineering at the Moscow Institute of Radio Engineering, Electronics, and Automation. N. A. Babakov had authored more than 75 scientific publications and inventions in the field of control equipment and control systems, which found wide practical application. Under his direction the staff of the Chair published a series of monographs and textbooks and carried out research of major importance to the national economy. Nikolay Aleksandrovich had taught a large number of young scientists and highly qualified specialists in the classrooms of the Institute of Control Problems and the Moscow Institute of Radio Engineering, Electronics, and Automation. He has engaged in extensive scientific-organizational and civic activities in his capacity as Deputy Chairman of the Scientific Council on the Control of Motion and Navigation, USSR Academy of Sciences, member of the Scientific Methodological Council For Automation and Telemechanics under the USSR Ministry of Higher Schools, and Deputy Chairman of the Experts Council of the USSR VAK [High Degree Commission]. Nikolay Aleksandrovich Babakov, a communist, an eminent scientist in the domain of control theory, and a talented leader and a perceptive and responsive comrade, leaves behind him a bright and lasting memory in the hearts of those who studied under him and worked with him.
[131-1386]

1386
CSO: 1863

INFORMATION ON AUTHORS

Kiev KIBERNETIKA in Russian No 3 1979 p 119

[Text] AKOPYAN, KARLEN AVAKOVICH, division chief, Central Scientific Research Laboratory of City Management Control Systems, Yerevan gorispolkom.

ALEKSEYENKO, VIKTOR GRIGOR'YEVICH, leading designer, SKB MMS [Special Design Bureau for Mathematical Machines and Systems], IK [Cybernetics Institute, Ukrainian SSR Academy of Sciences], Kiev.

ALESHKINA, SUSANNA MIKHAYLOVNA, senior engineer, IK, Kiev.

BARANOV, SERGEY NIKOLAYEVICH, candidate of physical and mathematical sciences, junior scientific worker, Computer Center, Leningrad State University imeni A.A. Zhdanov.

BISTRITSKAS, VILYUS BRONISLAVOVICH, candidate of physical and mathematical sciences, senior scientific worker, Institute of Mathematics and Cybernetics, Lithuanian SSR Academy of Sciences, Vil'nyus.

BOZHICH, VLADIMIR IVANOVICH, senior engineer, Taganrog Radiotechnical Institute.

BONDAROVSKAYA, VALENTINA MATVEYEVNA, candidate of psychological sciences, senior scientific worker, Elektronmash Production Association.

BROVARNIK, VYACHESLAV VLADIMIROVICH, candidate of physical and mathematical sciences, junior scientific worker, IK, Kiev.

VALUZHIS, KAZIMERAS-AL'GIDRAS KAZIMERO, candidate of technical sciences, reader, Kaunas Polytechnic Institute.

VARTAPETOV, EDUARD ASHOTOVICH, candidate of physical and mathematical sciences, director, Central Scientific Research Laboratory of City Management Control Systems, Yerevan gorispolkom.

VEL'BITSKIY, IGOR' VYACHESLAVOVICH, doctor of physical and mathematical sciences, division chief, IK, Kiev.

GIMEL'FARB, GEORGIY L'VOVICH, candidate of technical sciences, senior scientific worker, IK, Kiev.

GRIGOR'YAN, YURIY GEORGIYEVICH, candidate of physical and mathematical sciences, laboratory chief, Armenian Scientific Research Institute of Power Engineering, Yerevan.

GRINCHENKO, TAMARA ALEKSEYEVNA, candidate of physical and mathematical sciences, chief project designer, SKB MMS, IK, Kiev.

DRIYANSKIY, VLADIMIR MIKHAYLOVICH, senior engineer, IK, Kiev.

KABULOV, ANVAR VASILOVICH, candidate of physical and mathematical sciences, senior scientific worker, Uzbek Scientific Production Association Kibernetika, Uzbek SSR Academy of Sciences, Tashkent.

KALYAYEV, ANATOLIY VASIL'YEVICH, doctor of technical sciences, rector, Taganrog Radiotechnical Institute.

KAPITONOVA, YULIYA VLADIMIROVANA, doctor of physical and mathematical sciences, laboratory chief, IK, Kiev.

KATSEV, SERGEY BORISOVICH, junior scientific worker, Leningrad Electrotechnical Institute of Communications imeni M.A. Bonch-Bruyevich.

KOTOV, VADIM YEVGEN'YEVICH, candidate of physical and mathematical sciences, deputy director, Computer Center, Siberian Department of the USSR Academy of Sciences, Novosibirsk.

KRAYZMER, LEONID PAVLOVICH, doctor of technical sciences, professor, Leningrad Agricultural Institute.

KUKSA, ANATOLIY IVANOVICH, candidate of physical and mathematical sciences, senior scientific worker, IK, Kiev.

KUKHAR, ROMAN BOGDANOVICH, candidate of physical and mathematical sciences, division chief, Computer Center, L'vov Branch, Institute of Economics, Ukrainian SSR Academy of Sciences.

LISOVIK, LEONID PETROVICH, candidate of physical and mathematical sciences, lecturer, Kiev State University.

LYANTSE, EDUARD VLADISLAVOVICH, senior engineer, Computer Center, L'vov Branch, Institute of Economics, Ukrainian SSR Academy of Sciences.

MEL'NIKOV, OLEG ISIDOROVICH, candidate of physical and mathematical sciences, senior instructor, Belorussian State University imeni V.I. Lenin, Minsk.

MISHCHENKO, ANDREY TIKHONOVICH, candidate of technical sciences, senior scientific worker, IK, Kiev.

ONOPCHUK, YURIY NIKOLAYEVICH, candidate of physical and mathematical sciences, senior scientific worker, IK, Kiev.

PSHENICHNAYA, LYUDMILA EMMANUILOVNA, candidate of philological sciences, senior scientific worker, IK, Kiev.

PSHENICHNYY, BORIS NIKOLAYEVICH, doctor of physical and mathematical sciences, division chief, IK, Kiev.

RASHIMAS, ANTANAS PRANOVICH, senior scientific worker, Scientific Research Institute of Cardiovascular System Physiology and Pathology, Kaunas Medical Institute.

RED'KO, VLADIMIR NIKIFOROVICH, doctor of physical and mathematical sciences, department chairman, Kiev State University.

RYBAK, VITALIY IVANOVICH, candidate of technical sciences, laboratory chief, IK, Kiev.

SAPOZHNIKOV, VLADIMIR VLADIMIROVICH, candidate of technical sciences, reader, Leningrad Institute of Railroad Transportation Engineers imeni Academician V.N. Obraztsov.

TOZIK, VYACHESLAV TROFIMOVICH, candidate of technical sciences, lecturer, Leningrad Agricultural Institute.

FRICH, KLAUS, doctor of technical sciences, division chief, Central Institute of Cybernetics and Information Processes, GDR Academy of Sciences, Berlin.

KHOMENKO, LARISA VASIL'YEVNA, engineer, IK, Kiev.

TSARYUK, NIKOLAY PAVLOVICH, leading designer, SKB MMS, IK, Kiev.

SHAFRANSKIY, YAKOV MIKHAYLOVICH, junior scientific worker, Institute of Technical Cybernetics, Belorussian SSR Academy of Sciences, Minsk.

SHVARTSE, GYUNTER, staff member, Central Institute of Cybernetics and Information Processes, GDR Academy of Sciences, Berlin.

SHUL'GA, VLADIMIR IL'ICH, junior scientific worker, IK, Kiev.

SHCHEPAKIN, MIKHAIL BORISOVICH, candidate of physical and mathematical sciences, senior scientific worker, IK, Kiev.

YAKOVLEVA, ALLA PETROVNA, junior scientific worker, IK, Kiev.

[387-11746]

11746
CSO: 1863

PUBLICATIONS

USSR

UDC 681.51:007.5

DISCRETE PROCESSING SPEECH SIGNALS

Moscow DISKRETNAYA OBRABOTKA RECHEVYKH SIGNALOV in Russian, Computer Center of the USSR Academy of Sciences, 1978 132 pp

TRUNIN-DONSKOY, V. N., Editor

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10,81.345 by V. A. Garmash]

[Text] This is a collection of articles dealing with: the construction of automatic speech comprehension systems; algorithms for the isolation of the fundamental tone by spectral methods for a medium-class computer; the application of the odd-set theory to the classification of speech sounds; and dynamic computer analysis of the tones of Vietnamese speech. Other topics considered are: speech analysis with the aid of techniques of linear prediction, a device for isolating speech attributes in an information system; analysis of averaged formant frequencies of the vowels of tonal language for purposes of automatic recognition.
[131-1386]

1386
CSO: 1863

USSR UDC 681.322.068

A METHOD OF DESCRIBING ALGORITHMIC LANGUAGES WHICH IS ORIENTED TOWARDS IMPLEMENTATION

Novosibirsk SIBIRSKIY OTDEL AN SSSR. VYCHISLITEL'NYY TSENTR. PREPRINT NO 74 in Russian 1977 39 pp

YERSHOV, A. P. and GRUSHETSKIY, V. V.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITE'NAYA TEKHNIKA in Russian No 5, 1978 Abstract 5B190K by S. G. Romanova]

[Text] It is indicated that the actualization of systems for constructing translators requires the application of a working method for the description of algorithmic languages which satisfies several contradictory requirements. One of the problems is the presence of several levels in the language under consideration and several mechanisms for its realization. Frequently chosen as the main invariant in the treatment of a language is its data base, which in essence is the structural embodiment of an attributive tree for program analysis. It is noted that generalizing the postsyntactic representation of a program leads to the concept of an abstract language, which fixes the method of naming the grammatical elements of a language, but which offers freedom in the choice of the operating equipment and method of specifying the data base. In order to orient the syntactical analysis towards the selected language data base, the concept of a regularized contextually free grammar is introduced, in which the nonterminal symbols are broken down into lexemes, concepts and positions. Lexemes isolate the automatic mechanisms of the lexical analysis from the more general procedure of the breakdown, while the positions play the part of a selector in the data base, where the data supply the constituents of a given concept. The methodological aspects of the implementation of the given method are discussed, while its fundamental stipulations are compared with other similar works. A systematic procedure is described for obtaining an object program from the interpretation semantics. [442-8225]

8225
CSO: 1863

USSR UDC 681.518:519.878

THE OKHRA SYSTEM. BASIC CONCEPTS. BASIC OPERATIONS SISTEMA OKHRA. OSNOVNYYE PONYATIYA. BAZOVYYE OPERATSII in Russian Preprint No 67, Institute of Applied Mathematics, USSR Academy of Sciences 1979 26 pp

GORBUNOV-POSADOV, M. M. and KHIZDER, L. A.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.584. Summary]

[Text] The OkHRA system is designed to organize the storage of information in external carriers: magnetic tapes, disks, and drums. The basic concepts of the system and the basic attendant operations with buffers and external carrier units are described.
[131-1386]

1386
CSO: 1863

USSR UDC 681.322.068

THE SAFRA APPLIED PROGRAMS PACKAGE. SYSTEM LOADING. GENERAL DESCRIPTION

Moscow PAKET PRIKLADNYKH PROGRAMM SAFRA. SISTEMNOYE NAPOLNENIYE. OBSHCHEYE OPISANIYE in Russian Preprint No 85 of USSR Academy of Sciences Institute of Applied Mathematics, 1977 27 pp

GORBUNOV-POSADOV, M.M., KARPOV, V.YA, KORYAGIN, D.A., KRASOTCHENKO, V.V. and MARTYNYUK, V.V.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B75K]

[Text] [None] [442-8225]

USSR UDC 681.51:621.3.049.75

ALGORITHMIC SIMULATION IN THE PROLOG SYSTEM

SBORNIK TRUDOV. INSTITUT PROBLEM UPRAVLENIYA [Collection of Works, Institute of Control Problems] in Russian No 15, 1978 pp 67-72

GALAKTIONOVA, YE. I.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.870]

[Text] The statement and solution of the problem of algorithmic simulation in the PROLOG digital automaton automatic design system are presented. Figure 1; references 3.
[131-1386]

1386
CSO: 1863

ABSTRACTS FROM THE JOURNAL 'PROGRAMMING'

Moscow PROGRAMMIROVANIYE in Russian No 3, 1979 pp 95-96

UDC 681.3.06

PRINCIPLES OF COMPOSITIONAL PROGRAMMING

[Abstract of article by Red'ko, V. N.]

[Text] General and special principles of compositional programming are described and its basic concepts are stated. The account is illustrated with examples.

UDC 681.142.2

METHOD OF DESCRIBING PROGRAMMING LANGUAGES

[Abstract of article by Tuzov, V. A.]

[Text] The principle of optimum displacement of one type of value by another is formulated. Set as the basis of a language, it makes the language more flexible and laconic, and discription of the language is simplified. A class of producing grammars is proposed, besides the syntactic structure they describe the data structure of a language.

UDC 519-95

LEXICAL ANALYSIS OF LL(k)-LANGUAGES

[Abstract of article by Glushkova, V. N.]

[Text] The problem of consolidating input symbols in the lexical analysis of LL(k)-languages is examined. The main result of the work is a theorem on the class of languages for which an equivalent simple consolidated SLL(1)-grammar can be constructed. It turns out that the class of such languages is a subclass of LL(k)-languages broader than the class of LL(1)-languages.

UDC 681.142.2

SEPARATED FORM OF CYCLES ON ARRAYS

[Abstract of article by Nuriyev, R. M.]

[Text] A form of assigning the body of a cycle in the form of a series of units, each of which controls only the selection of elements of arrays used in subsequent units, is proposed. The effective representability of the body of any cycle in that form is demonstrated, and also invariance of the number of units in relation to functionally equivalent compilations.

UDC 519.767.2

FUNCTIONAL SEMANTICS OF OPERATORS OF DATA STRUCTURE CONVERSION

[Abstract of article by Bublik, V. V.]

[Text] The article is devoted to substantiation of the semantics of operators of conversions of data with a complex structure, which is done on the basis of an abstract algebraid theory of data structures. Operators of control determined by the data structure are examined. An example of the application of the obtained results to substantiate programs is presented.

UDC 681.142.2

ON THE UNIQUENESS OF REDUCTIONS IN ALGOL-68

[Abstract of article by Shatalov, V. V.]

[Text] The article examines the mechanism of reductions in the algorithmic language ALGOL-68. The allowable sequences of reductions are represented by means of regular expressions. The uniqueness of the reductions is demonstrated.

UDC 519.682.1

INCREASE OF THE RATE OF TRANSLATION OF PROGRAMMING LANGUAGES DURING USE OF PRECEDENCE RELATIONS

[Abstract of article by Kogan, B. I.]

[Text] The parameters are determined of an original grammar, the change of which by means of a transformation of the same grammar makes it possible substantially to decrease the translation time. A class of grammar is introduced, during identification of which the ratios of preceding and seniority are used and in practice editing, not having semantics, is lacking.

UDC 681.3.06

GENERATOR SYSTEM FOR TESTING ON A YeS COMPUTER ALGORITHMS FOR THE SOLUTION OF LINEAR PROGRAMMING TASKS

[Abstract of article by Grinshteyn, V. A., and Rabashevich, Yu. B.]

[Text] The article examines the structure of a program generator of initial data for experimental investigation on a YeS computer of algorithms for the solution of some classes of linear programming tasks. Questions of the systems organization of the generator are examined.

UDC 681.3.06.51

AUTOMATION OF RECORDING THE USE OF COMPUTER SYSTEM RESOURCES IN MULTIPROGRAMMING IN A YeS COMPUTER

[Abstract of article by Karpov, B. S.]

[Text] Questions of the application of a systems monitoring program to automate recording the resources of a computer system are examined. Methods are proposed for calculating the use of resources on the basis of information gathered by the systems monitoring program.

UDX 681.3

AUTOMATION OF THE PLANNING AND PRINTING OF TABULAR DOCUMENTS

[Abstract of article by Petrov, V. I., and Seleznev, M. V.]

[Text] A specialized high-level language is proposed for the recording of tasks in the planning of tabular documents. A heuristic algorithm is presented for the planning of tables and is made the basis of a system of table planning and printing that has been realized on the basis of a YeS disk operating system.

UDC 681.3.06

USE OF A MACROGENERATOR TO REALIZE PROGRAMMING LANGUAGES OF STsVM [specialized digital computer] AND MACROPROCESSORS

[Abstract of article by Muchnik, M. M.]

[Text] Examined in the article are the principles of the realization of high-level languages by means of a syntactically unoriented macrogenerator. The syntax and semantics or a programming language are described in the form of a set of macrodefinitions. A procedure is described for the realization of a syntactically oriented translator with use of the method of recursive search.

CSO: 1863

USSR UDC 681.51

WORKS OF YOUNG SCIENTISTS AT THE INSTITUTE OF CYBERNETICS

Baku TRUDY MOLODYKH UCHENYKH INSTITUTA KIBERNETIKI in Russian 1978 manuscript deposited at VINITI 21 Aug 79 No 3121-79 Dep, 132 pp

INSTITUTE OF CYBERNETICS AZERB SSR ACADEMY OF SCIENCES

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.5 DEP Author's abstract.]

[Text] The collection contains papers dealing with: the maximum principle as applied to a non-smooth control problem; an application of the theory of sliding modes to the pursuit problem; the decomposition method of designing three-dimensional mechanisms on a computer; an island method; a method for forecasting the developmental indexes of the economy of Azerbeijan; a combined method for the solution of the problem of Boolean programming; a numerical solution of the Stefan-type two-dimensional problem with allowance for the source function; a numerical solution of a Verigin-type two-dimensional problem with allowance for the system of sources and sinks; successive refinement of solutions of the binary programming problem; synthesis of the optimal control of certain oscillatory processes in the presence of incomplete measurements; the grid method for the T_3 problem; the grid method for the solution of an elliptical equation with two degeneration lines; the grid method for the E-problem; finite control of systems with diverging argument; basic principles for developing a standard implementation monitoring subsystem for a functioning RASU [republic-wide automatic control system]; the existence of a solution of the neutral-type integrodifferential equation; the reconstruction of functions representing solutions of two-dimensional Cauchy problems; an approximate solution of a conditionally correct Cauchy problem of a differential-operator equation in Banach space; stages in the development of FK [expansion unknown] "Population;" application of the critical-path method; the necessary conditions of optimality in systems with a mobile right-hand end of trajectory; and a version of polyhedral mapping. Also considered are polyhedral differential inclusions in linear problems of optimal control on linear manifolds; necessary and sufficient conditions for optimality of control in linear multidmensional discrete systems; enhancing the effectiveness of the "heavy ball" method in problems of multiextremal optimization; necessary conditions of optimality for delay-type discrete systems; and domains of attainability of quasi-linear control systems in Banach spaces. Bibliography. [131-1386]

1386
CSO: 1863

USSR UDC 681.322.068

ALGORITHMS AND PROGRAMS. ANNOTATED BIBLIOGRAPHY NO 10

Moscow ALGORITMY I PROGRAMMY. ANNOTIR. UKAZATEL' LIT. NO. 10 in Russian 1977 67 pp

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B176K by S. G. Romanova]

[Text] The collection contains abstracts of papers on problems in computer engineering. Programming language theory and programming languages of the ALGOL-60, ALGOL-68, COBOL, LISP, PASCAL, SIMSCRIPT and FORTRAN types, etc., are treated. General questions involving the ALGOL-60 and FORTRAN languages are analyzed and software systems are treated; also considered are computational mathematics, the solution of problems from engineering and the natural sciences; statistical processing and the processing of observations; modeling, the study of operations, forecasting, diagnostics and pattern recognition, as well as questions of optimum programming and control of any processes. Abstracts are given for articles on problems of the development of programs for M-4030, M-5010, M-6000, BESM-6, YeS EVM, Minsk-32, Nairi and others.
[442-8225]

8225
CSO: 1863

USSR UDC 681.51.09:519.878

ANALYSIS OF COMPUTER RELIABILITY

Kiev RASCHET NADEZHNOSTI EVM in Russian Tekhnika 1979 232 pp

SHUBINSKIY, I. B. and PIVEN', YE. N.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.209K by I. V. Shevchenko]

[Text] The principles and techniques of the analysis of computer reliability are described along with the attendant realizable functional algorithms. The effect of equipment malfunctions and of the consequent errors in the realization of the logic functions of computer elements and devices on the reliability of implementation of microoperations, instructions for

typical operations, and algorithms as a whole is estimated. It is pointed out that from the standpoint of the possibilities for the solution of complex problems as well as of the simplicity of the final results obtained the maximum effect is achieved by the simultaneous use of several different mathematical methods.
[131-1386]

1386
CSO: 1863

USSR UDC 681.51:519.8

BASIC CONCEPTS OF THE GENERAL THEORY OF PROBLEMS

BAZOVYYE PONYATIYA OBSHCHEY TEORIY ZADACH in Russian Preprint No 23, Institute of Cybernetics, UkrSSR Academy of Sciences 1979 260 pp

BALL, G. A.

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.380 by V. A. Garmash]

[Text] The general scientific concepts needed to develop the theory of problems (including such concepts as "system," "structure," "information," "model," "meaning," "effect," "operation") are described, and their interrelationships are elucidated. A definition of the term "problem" is presented: a problem is a system whose necessary components include a) The subject of the problem, existing in some state; b) A model of the required (other than the actual) state of that subject. Distinctions between problems, their notational models, and the meanings of these models are offered. The theories of the means, techniques, and processes for the solution of problems are discussed. References 20.
[131-1386]

1386
CSO: 1863

USSR UDC 681.385.66

COMPUTER PERIPHERALS USING MAGNETIC CARDS

Kiev PERIFERIYNYYE USTROYSTVA EVM NA MAGNITNYKH KARTAKH in Russian Naukov Dumka Publishers 1977 103 pp

CHERNYAK, R. YA.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract 5B609K by V. A. Garmash]

[Text] Questions of increasing the efficiency of data processing equipment through the use of magnetic cards as the data vehicle are treated. A uniform system of technical units designed for magnetic cards is considered, where the system is intended for the construction of peripherals. The results of experimental studies of the assemblies and components of the system are given. A number of computer peripherals designed around the technical units of the system are described. The economic impact of the use of magnetic cards to produce computer data preparation and input/output complexes is assessed. The book contains the following chapters; the magnetic card --a promising information vehicle for computer peripherals; assemblies and components of peripherals using magnetic cards; a uniform system of technical units employing magnetic cards; a data input/output and preparation equipment complex using magnetic cards; memories, and the economic impact of the use of magnetic cards in computer peripherals.
[442-8225]

8225
CSO: 1863

USSR

UDC 519.767.6-37:007

MAPPING OF SPATIAL RELATIONSHIPS

Kiev OB OTOBRAZHENII PROSTRANSTVENNYKH OTNOSHENIY in Russian 1979 manuscript deposited at VINITI 19 Jul 79 No 2710-79 Dep, 19 pp

KISLENKO, YU. I., Institute of Cybernetics, UkrSSR Academy of Sciences

[From REFERATIVNYY ZHURNAL. TEKHNICHESKAYA KIBERNETIKA No 10, 1979 Abstract No 10.81.246 DEP]

[Text] Certain special features of the process of mapping the "space" category in the plane of the analysis of both the lexicographic composition of the mapping techniques and their structural organizations are considered. Analysis of mapping techniques serves to uncover discrete aspects of the pattern governing the process of mapping spatial relationships and to construct a model of the process. According to the proposed model, the process of spatial perception may be represented as a purposive search that includes various procedures for determining such attributes of space as "direction," "distance," "universality," etc. The proposed model was partially realized with the aid of a BESM-6 computer ("DUBNA" Operating System). Allowing for the depictive resources of semantics, base elements of categories of direction and distance are stored in the system's memory and the methods of their interaction are specified. In the general case the program performs a conversion of the "text-reality" type and, on the basis of the input text determining a class of spatial relations, forms in a specified plane specific half-spaces corresponding to the input relations. The possible range of applications of such systems includes systems for the perception of textual information as well as spatial orientation control systems for automata, based on commands given in a natural language. Figures 4; references 5. [131-1386]

1386
CSO: 1863

USSR

UDC 681.322.068

PROGRAMMING IN THE REPORT GENERATOR PROGRAM LANGUAGE IN THE UNIFIED SYTSEM OF ELECTRONIC COMPUTERS

Moscow PROGRAMMIROVANIYE NA RPG V YES EVM in Russian. Statistika Publishers, 1977 168 pp

LIPEN', YU. M., MARGOLIN, M. S. and MARUK, Z. A.

[From REFERATIVNYY ZHURNAL. AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 5, 1978 Abstract No 5B175K by S. G. Romanova]

[Text] Programming in the RPG [report program generator] language in the YeS EVM [unified system of electronic computers] is described. The RPG language is intended for solving problems, the major result of which is the generation of various kinds of reports. The preparation of reference sources, documents, summary reports based on the data fed in with its simple processing (summing, collating with respect to an attribute, etc.) are included among such tasks. The method of specialized blank forms is taken as the basis of the language; the input and output data as well as the procedures for processing entries of the same type are written on the blank forms. The RPG language is described, as well as the programming with it in the disc operating system of the unified system of computers, preparation for running the RPG programs and the interfacing of the RPG programs to programs in other languages.
[442-8225]

8225
CSO: 1863

ACADEMICIAN LAVRENT'YEV RECALLS FIRST DIGITAL COMPUTER WORK

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 10, 1979 pp 192-198

[Memoirs. Part 1, Chapter 6 of 'Life Experiences: Fifty Years in Science' by Mikhail Alekseyev Lavrent'yev, Honorary Chairman of the Siberian Department of the Academy of Sciences]

[Excerpts] In 1946 I received the State Prize for work on quasi-conformable mapping and for my solution to the related problem of the solitary wave (both these works were translated and published abroad). In the same year I was elected academician of the USSR Academy of Sciences and, in the following year, I was elected to the newly created Academy of Artillery Sciences. In 1949 I again received the State Prize (for work on accumulation) and was appointed director of the Institute of Precision Mechanics and Computer Technology. In 1950 I was elected secretary-academician of the Physics and Mathematics Department of the USSR Academy of Sciences. I will recount briefly some of the events which I witnessed during each of these stages.

EVM (electronic computing machines). Shortly after World War II and the return of mathematicians to Moscow, within the Steklov Institute of Mathematics the issue was raised of the important role which EVM must acquire in the coming years. This point of view was not shared by the Technical Sciences Department of the Academy of Sciences. That department devoted all its attention to mechanical calculating machines (differential analyzers) and to analog machines. There was even a note in a Moscow newspaper which criticized and rejected electronic machines on philosophical (!) grounds.

In 1947, at a general meeting of the Academy of Sciences celebrating the Thirtieth Anniversary of the October Revolution, I presented an overview of paths of development in Soviet mathematics. It was necessary for me to mention our lag in the field of machine mathematics.

After EVM appeared in the U.S., a split occurred among our mathematicians and electrical and mechanical engineers. The majority viewed EVM as publicity without any future and suggested that the production of analog and mechanical computing machines be increased. Associated with this trend was the opening of the Institute of Precision Mechanics and Computer Technology.

A completely different situation developed in Kiev. Immediately after the war, A. A. Bogomolets invited S. A. Lebedev to Kiev. Lebedev, while still in Moscow, had begun to carry out calculations and to work out (on paper) the operating principles of EVM. The discussions of a group of Moscow mathematicians possessing wide ranging expertise (Lebedev, M. V. Keldysh, D. Yu.

Panov, L. A. Lyusternik, M. R. Shura-Bura and others) convinced me of the enormous scientific, technological and defensive significance of EVM. I related to Bogomolets the situation with regard to EVM and the necessity of supporting Lebedev. I received complete authority to advance this new cause as well as money, equipment and quarters.

The place designated for the EVM and Lebedev was located next to my laboratory in Feofaniya (near Kiev).

Lebedev was able in a short time to mobilize associates of his electrical engineering institute and to assemble and start training a young collective with the active support of Bogomolets and the entire Presidium of the Ukrainian Academy of Sciences, within two years a prototype was produced and, in 1947, it began operation. This was the first Soviet EVM - MESM (small electronic calculating machine). We showed it to Krushchev, first secretary of the Ukrainian Central Committee, to Grechko, commander of the Kiev military district, and to other highly-placed guests.

This greatly increased interest in the new type of computing device. People from Moscow started coming to see the machine. The situation was clearly changing in favor of EVM. A decision was made to change the profile of the Institute of Precision Mechanics and Computer Technology, to replace the Institute's administration, and to throw all efforts behind the creation of large EVM.

When the Central Committee asked me to take charge of this matter, I agreed upon the condition that Academician Lebedev (then director of an electrical engineering institute of the Ukrainian Academy of Sciences in Kiev) would be immediately appointed chief designer. This condition was met.

I was summoned by the president of the Academy of Sciences S. I. Vavilov, who suggested that I go with him to see the then current director of work on computer technology. This person is no longer living and therefore we will call him X. On the way there, Vavilov advised me to reply entirely upon X for support because X alone could be of help while X could also block everything.

X greet us cordially but said right off: "I am going to construct the machines myself: I have all the resources necessary."

At this time (1950) the following situation had developed. Half of the collective at the Institute of Precision Mechanics and Computer Technology was designing elements for mechanical machines; the other half was working on the creation of electronic analog machines. The work was done on the premises of a clock factory. Construction of the Institute's new building was proceeding slowly and was scheduled for completion within two or three years.

In order to fulfill our task, new people, work space and apartments (for Lebedev and his group from Kiev) were sorely needed. To direct work in the Institute I recruited the services of Lyusternik, Panov, Shura-Bura and Diktin. Intensive work began on the construction of EVM, programming problems and software. Getting salaries and work space for needed specialists was a complicated problem. There was only one solution: get rid of the Institute's former associates--those working on differential analyzers and analog machines.

This is how it was done. In December of 1950 the Institute's science secretary compiled the Institute's report for 1950 and its plan for 1951. As usual, the 1950 plan was 'completely fulfilled.' However, I noticed that the new 1951 plan coincided almost exactly with the 'fulfilled' plan. I published the following order: 'For deceiving the leadership of the Academy of Sciences, science secretary comrade so and so is dismissed from the Institute.' I received many calls (even from Vavilov) about the illegality of the dismissal and the necessity of withdrawing my order. The matter was given to the courts: district, city, oblast,' republic. All these courts decided in favor of reinstating the science secretary. The matter was settled by the Supreme Court, which ruled the dismissal legal. Thereupon the associates who were of no use to the Institute quit 'due to personal wishes.'

Serious work began in the Institute on the design of EVM, on their software, and on preparing numerical models and complex control systems (Lyusternik, Shura-Bura and others). Nevertheless, it was clear to us (the heads of the Institute) that, given present circumstances, the creation of machines would require many years. It was essential that decisive action be taken to gain the interest of at least one powerful organization. I took the matter personally to one minister. A commission headed by Academician I. Ye. Tamm was appointed. The commission investigated my Institute (the M-20 machine) and the institute which was building the Strela. A decision was made in favor of the Strela.

Lebedev, Panov and I then wrote to the Central Committee and the Council of Ministers. We requested: 1) that the construction schedule for our Institute be accelerated by one year; 2) that we receive half of the apartments in the Academy of Sciences new living quarters; 3) the right to priority selection of the best students from the Moscow Physico-Technical Institute and from the Moscow Power Engineering Institute; 4) the subordination to us for five years of Lebedev's previous institute in Kiev; 5) that our salaries be made equal to those of the institute producing the Strela; and 6) that we be issued 150 vacuum tubes. A favorable decision was made on all points.

In 1952, we moved to our new building. Work continued day and night. Soon thereafter, however, I received an urgent assignment to an enterprise outside of Moscow and was relieved of my Moscow responsibilities. Lebedev became the Institute's director.

In 1953 I was called to Moscow to join a commission investigating and certifying two machines: the M-20 (USSR Academy of Sciences) and the Strela. The situation was extremely unfavorable for our EVM. First, all new memory devices of Lebedev's design were sent, on orders from above, to the Strela group. We were forced to produce memory units of an acoustical type, reducing speed by a factor of 15-20. Second, the commission's chairman for the certification was an eminent administrator who had created his computer center using Strela.

The commission reviewed the problems, which had been assigned by a high-level organization, and then the problems were solved by both machines. When giving his evaluation of the completed work, the commission's chairman remarked that one of the assigned problems had no meaning. This remark saved us. Right after the meeting, I went to the heads of the organization which had assigned the problems and said to them: "You are working on problems which have no sense. You are wasting enormous sums of money and the time of our leading scientists. I am forced to write about this to the very top. "What do you want?" "I want: first, a half-year delay of the certification hearings and second, a supply of memory devices of Lebedev's design within two weeks."

Within half a year BESM-1 (the first large electronic calculating machine) of the Academy of Sciences solved all problems submitted to it several times faster than Strela. The competition between the two firms was won not by that with an abundance of resources, people and space, but by that with advanced ideas.

BESM-1 was the first of a series of Soviet digital computers (Minsk, Ural, Dnepr, Mir and others). The most powerful of these machines was the BESM-6, which became the standard machine for equipping the country's major computer centers.

During the period 1954-1956 Soviet EVM were on the same level as the best American EVM and our mathematicians who had constructed and used these EVM in no way lagged behind their American colleagues. How then can we explain our present lag behind the Americans in both the power and use of EVM? I see several causes. Satisfied with successes achieved, a significant part of the mathematicians and electronic designers turned to other problems. An even worse mistake was made in the training of cadre for the new technology. The phenomenal calculating speed of EVM gave rise to the false notion that EVM would take care of all work in applied mathematics and that, therefore, the number of mathematicians would not have to increase but could even decrease. Not taken into account was the fact that to obtain valuable new scientific results with the help of EVM, more mathematicians are needed and their qualifications must be significantly greater. The training of people in applied mathematics is, in my opinion, our number one problem. It is the most important condition for continued scientific and technological progress.

[200]
CSO: 1863-P

- END -